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Woodstock, Vermont



Avian Surveys in Northeast Temperate Network Parks

Technical Report NPS/NER/NRTR--2005/004



ON THE COVER

Least Tern (*Sterna antillarum*) chick and egg

Female Common Eider (*Somateria mollissima*) sitting on a nest

Photographs by: Carol Trocki

Avian Surveys in Northeast Temperate Network Parks

Technical Report NPS/NER/NRTR--2005/004

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Project Goal

The goal of this project was to determine the spatial distribution and abundance of birds in seven of the national parks in the Northeast Temperate Network (i.e., Boston Harbor [BOHA], Minute Man [MIMA], Morristown [MORR], Roosevelt-Vanderbilt [ROVA], Saugus Iron Works [SAIR], Saratoga [SARA], and Weir Farm [WEFA]). Within each park, we were interested in comparing vertebrate abundance among species, habitats, and sites.

Past surveys in parks have often been habitat specific with sampling non-randomly located, which has limited the spatial inferences that can be made from these historical datasets. Our inventory was designed using quantitative sampling techniques to calculate unbiased estimates of population and community parameters for a variety of birds. Using these techniques, data can eventually be used to assess changes in population sizes over both space and time.

Methodology

No one survey technique will work for all species of birds (Bibby et al. 1992). Since parks in the Northeast Temperate Network tend to be dominated by forests, grasslands, or agricultural habitats, with only a small percentage of some parks consisting of wetlands and open water habitats, we focused survey efforts on breeding, diurnal landbirds. Given that diurnal landbirds account for the vast majority of breeding and migrant avian species in parks in the Northeast Temperate Network (including species of special concern, and Threatened and Endangered species), we decided that point counts were the most appropriate survey technique to inventory birds in each park (Ralph et al. 1995, Fancy and Sauer 2000).

During point counts, observers stand at a predetermined point and count the number of birds detected within a fixed time period (e.g., five minutes). The vast majority (>90%) of birds detected during these surveys are only heard and never seen. Point counts are most effective during the peak of the breeding season, when males are on territory and actively singing (Bibby et al. 1992, Ralph et al. 1995). Nocturnal species, raptors, waterbirds, and wintering and migrating species are not adequately and consistently detected with point counts, therefore other methods were necessary to inventory these guilds of birds. In addition to point count surveys, we conducted winter / spring waterbird surveys at ROVA in 2003 and extensive waterbird surveys at BOHA from 2001-2003. All additional species detected during site visits or while traveling between point count stations, but not during point counts, have been represented in an overall species list for each park.

Point Count Surveys

Point counts based on Variable Circular Plots (VCP, Fancy and Sauer 2000) were the primary survey technique we used to inventory birds in the seven Northeast Temperate

Network Parks during the breeding season in 2002 and 2003. During VCP point counts, observers recorded the number of birds heard or seen from specific points and estimated the horizontal distance from the observer to each individual detected. Point count stations were placed >250 m apart and observers counted birds for only 5 minutes at each point to minimize the probability of double-counting the same individual (Reynolds 1980, Ralph et al. 1995).

Point count station locations were determined by overlaying a 250-m grid system on each park and locating potential sampling stations in the center of each 1.56 ha grid cell, thereby insuring that potential sampling stations would be >250m apart (Reynolds 1980, Ralph et al. 1995b). Grid cells that were <25% inside park boundaries were not considered for sampling.

The total number of potential sampling stations in each park varied as function of park area, and ranged from 3 to 222 based on park area. Given budgetary and time constraints, we decided that a maximum of 75 point count stations could surveyed in each park during each year. This meant that at mid-sized parks (MIMA and ROVA) each sampling station was visited once during each year, while at small parks (SAIR, WEFA) all sampling stations were visited multiple times each year. Although BOHA is a large park, available resources allowed for multiple station visits in 2002.

At both SARA and MORR, we surveyed a maximum of 75 points each year. In 2002, we surveyed 75 points in each park that were randomly selected from the initial pool of potential stations. In 2003, we surveyed an additional 75 points at each park that were randomly selected from this same pool, but excluded those stations sampled in 2002.

Surveys were conducted from dawn until a maximum of 4 hours after dawn (Ralph et al. 1995) in all parks except BOHA, where because the observer had to use boat transportation to access the islands surveys began approximately one hour after dawn and were concluded by 12:00 PM. All surveys were conducted between 21 May and 1 July at the height of the breeding season, and surveys were not conducted during high winds or heavy rains.

Each observer was given a list of randomly-selected sampling stations (UTM coordinates) and a Garmin 76 global positioning system (GPS) unit, along with a map of their park(s) showing sampling stations plotted on an aerial photograph to facilitate navigation in the field. UTM coordinates were preprogrammed into GPS units and used to navigate between point count stations. Given typical accuracy estimates for these GPS units, observers were within 10 meters of predetermined point count stations. In SARA in 2002, the map alone was used to locate point count stations (i.e., no GPS was used, and no survey location coordinates were recorded) however, the observer at SARA in 2002 felt 100% confident in their ability to locate stations accurately based on their intimate knowledge of the park's landscape and the large number of landmarks available.

At each sampling station, observers recorded avian detections for 5 minutes. Birds were surveyed for only five minutes to reduce the probability that individuals were counted twice. A “detection” represents the first time an individual or flock of birds was observed (i.e., heard or seen) at a unique distance and direction from the point count station. For each detection, observers recorded the species, number of individuals, and type of observation (audio, visual, or flyover). Observers also estimated the distance to each detection. Detections were recorded as occurring during the first 3 minutes of the survey, or during the last two minutes of the survey. If an individual bird moved during the point count period, only the distance at first detection was recorded. Only species detected within 100 m of the sampling station were included in the analysis of VCP point count data, and all flyovers were excluded from analyses. Species uniquely detected as flyovers or outside the VCP (>100 m from the sampling station) were recorded as present in the park and appear in the overall species list.

During their first visit to each station, observers also recorded actual UTM coordinates in the field, a brief description of the station location to help with relocation, and a general habitat description of the VCP area. For the purposes of these analyses, the general habitat at each sampling station was categorized as: deciduous forest, shrub / early-successional, grassland / agricultural, freshwater wetland, shoreline / beach, or developed (predominantly manmade structures, manicured lawn, etc.). Sampling stations were assigned to habitat categories based on the dominant habitat type recorded for each station in the field. In many cases, more than one habitat type was present at a given station, so interpretation of habitat associations should be viewed with caution.

To determine the relative abundance of breeding birds within each park, we calculated the mean (± 1 standard error [SE]) number of individuals of each species detected per point count station. We also compared the relative abundance of each species among years, and determined the overall occurrence (% of stations where the species was detected) within each park. The spatial distribution of each species was determined by calculating the mean (± 1 SE) number of individuals detected at each individual point count station within each park. We also compared the total species richness (total number of species detected) at each point count station and the total number of species detected in each habitat category within each park.

Waterbird Surveys (ROVA)

ROVA waterbird surveys were conducted at fixed-point stations along the Hudson River between February and May 2003. All surveys were conducted using a spotting scope, with each point surveyed for a maximum of 10 minutes. At each station, the observer recorded the species and number of individuals detected, and estimated the distance to each individual detected. All detections were included in the analyses, regardless of distance, since the open water and wetland areas surveyed offered greater visibility than point count stations. The relative abundance of each species was determined by calculating the mean (± 1 SE) number of individuals detected at each fixed-point station.

Waterbird Surveys (BOHA)

We used a combination of boat-based surveys, transect surveys, and individual counts of colonial-nesting species to document breeding waterbirds in BOHA in 2002 and 2003. Additional winter waterbird surveys and shorebird surveys were also conducted in 2002 and 2003. A summary of the results of this intensive study has been included within this report for ease of comparison among parks. Detailed information on the methods and results of waterbird surveys in BOHA can be found in Paton et al. (in press).

Chapter 2

Avian surveys in Northeast Temperate Network Parks:

Boston Harbor Islands National Park Area (BOHA)

Background

The Boston Harbor Islands National Park Area (BOHA) includes 34 islands situated within the Greater Boston shoreline. Congress established the Boston Harbor Islands as a unit of the National Park System in 1996 with the threefold purpose of (1) preserving and protecting a drumlin island system within Boston Harbor, along with its associated natural, cultural, and historic resources, (2) telling the islands' individual stories and enhancing public understanding and appreciation of the island system as a whole, and (3) providing public access, where appropriate, to the islands and surrounding waters for education, enjoyment, and scientific and scholarly research for this and future generations (BOHA Draft General Management Plan 2000). The 34 islands of BOHA are managed by a unique, 13-member Partnership, which includes the National Park Service and other public and private organizations.

The only drumlin field in the United States that intersects a coast, 35 miles of relatively undeveloped shoreline within a densely settled urban area, resources associated with thousands of years of occupation by American Indians, and the complex natural communities of the intertidal zones all illustrate the intrinsic value of Boston Harbor Islands resources (<http://www.nps.gov/boha/pphtml/nature.html>). Habitats available to avian species in BOHA are extremely varied but include open water, intertidal habitats, rocky shores and beaches, maritime shrub communities, mature deciduous forests, and salt and freshwater marshes. Numerous researchers and recreational birding groups have recorded species occurring on various islands in BOHA over time. However, this was the first comprehensive survey to document breeding species throughout the park.

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at BOHA in 2002 and 2003. Prior to the 2002 breeding season, 82 randomly generated point count sampling stations were established within the park (Figure 2-1). Most stations were visited twice during the breeding season in 2002 and once during the breeding season in 2003 (Table 2-1). Due to its unique location, habitat types surveyed in BOHA differed from other parks in the Northeast Temperate Network. Sampling stations were categorized by the primary habitat in the immediate vicinity of the survey point. Habitat categories at BOHA included: Maritime Shrub, Deciduous Forest, Pine Forest, Grassland / Open, Freshwater Wetlands, Salt Marsh, Shore (rocky shore, beach, and dune communities), and Developed.

Twenty-one sampling stations (26%) were located in grassland or open habitats, 16 (20%) along the shore, 15 (18%) in developed areas, 10 (12%) in maritime shrub communities, 10 (12%) in deciduous forest, 7 (8%) in freshwater wetlands, 2 (2%) in salt marsh habitat, and 1 sampling station (1%) in pine forest (Table 2-1).

Winter waterbird surveys and shorebird surveys were conducted throughout BOHA by boat in 2002 and 2003. An intensive inventory of breeding waterbirds was conducted using various methods throughout the park during the breeding season in both years.

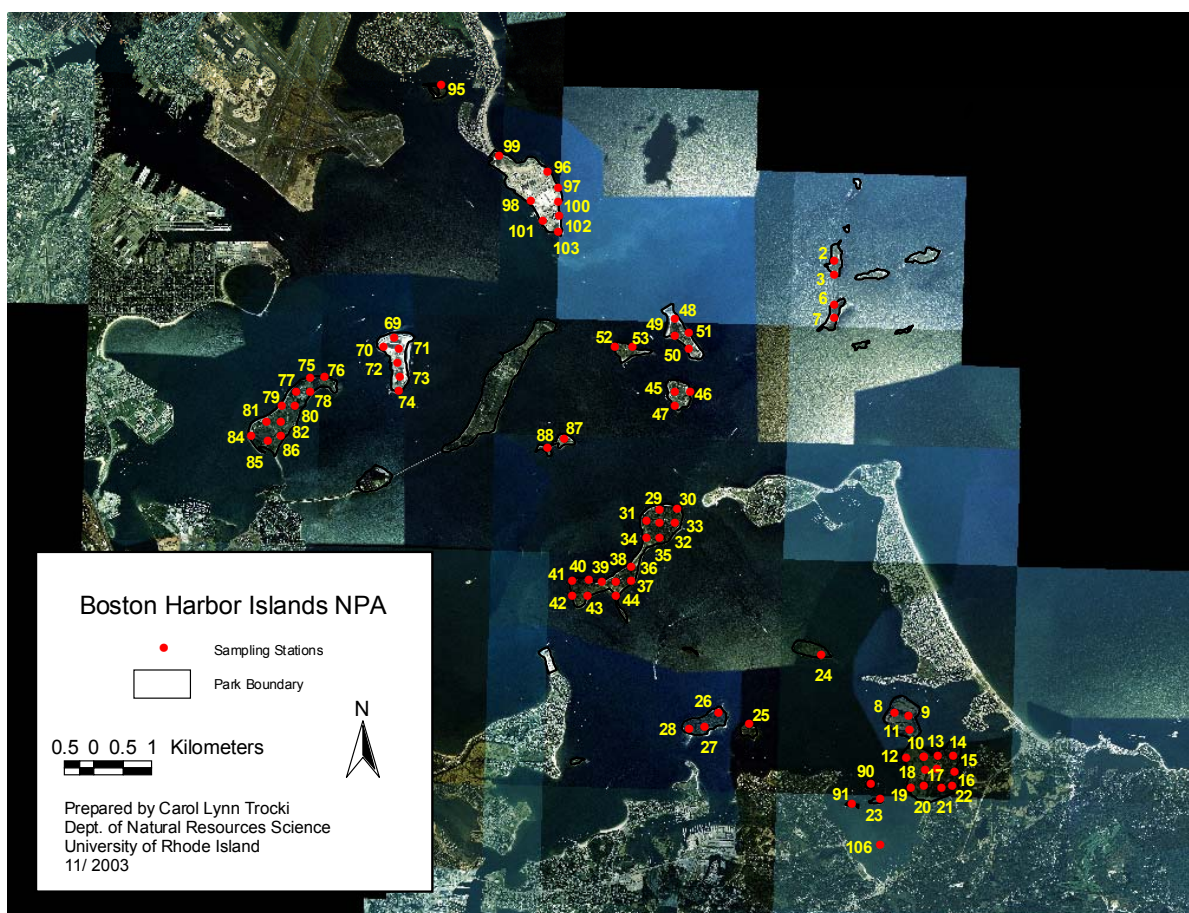


Figure 2-1. Avian point count stations surveyed in Boston Harbor Islands National Park Area (BOHA) during the breeding season in 2002 and 2003.

Table 2-1. UTM coordinates of point count stations in Boston Harbor Islands NPA, number of visits to each station during the breeding season in 2002 and 2003, and the dominate habitat type at each station.

Station Number	Island	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
2	Calf	343778	4689359	1	1	Maritime Shrub
3	Calf	343780	4689128	1	1	Shore
6	Great Brewster	343780	4688625	1	1	Shore
7	Great Brewster	343776	4688389	1	1	Grassland / Open
8	World's End	344809	4681636	2	1	Grassland / Open
9	World's End	345037	4681599	2	1	Deciduous Forest
10	World's End	345303	4680880	2	0	Grassland / Open
11	World's End	345058	4681344	2	1	Grassland / Open
12	World's End	345010	4680864	2	1	Grassland / Open
13	World's End	345303	4680880	2	1	Grassland / Open
14	World's End	345555	4680905	2	1	Maritime Shrub
15	World's End	345817	4680898	2	1	Deciduous Forest
16	World's End	345829	4680615	1	1	Wetland
17	World's End	345527	4680670	2	1	Grassland / Open
18	World's End	345324	4680658	2	1	Grassland / Open
19	World's End	345078	4680361	2	1	Grassland / Open
20	World's End	345309	4680370	2	1	Wetland
21	World's End	345601	4680361	2	1	Wetland
22	World's End	345797	4680379	1	1	Deciduous Forest
23	Sarah	344554	4680164	1	1	Shore
24	Bumpkin	343549	4682626	2	2	Deciduous Forest
25	Slate	342325	4681443	2	2	Shore
26	Grape	341797	4681626	2	2	Maritime Shrub
27	Grape	341553	4681380	2	2	Maritime Shrub
28	Grape	341298	4681375	2	2	Maritime Shrub
29	Peddocks	340781	4685108	2	1	Deciduous Forest
30	Peddocks	341084	4685120	2	1	Pine Forest
31	Peddocks	340569	4684913	2	1	Deciduous Forest
32	Peddocks	340779	4684886	2	1	Deciduous Forest
33	Peddocks	341047	4684878	2	2	Developed
34	Peddocks	340551	4684626	2	2	Grassland / Open
35	Peddocks	340793	4684613	2	2	Maritime Shrub
36	Peddocks	340292	4684130	2	1	Developed
37	Peddocks	340307	4683892	2	2	Developed
38	Peddocks	340039	4683879	2	1	Wetland
39	Peddocks	339796	4683877	2	1	Shore
40	Peddocks	339577	4683905	2	1	Maritime Shrub
41	Peddocks	339291	4683893	2	1	Shore
42	Peddocks	339296	4683622	2	2	Shore
43	Peddocks	339554	4683620	2	2	Shore
44	Peddocks	340045	4683620	1	2	Shore

Table 2-1. UTM coordinates of point count stations in Boston Harbor Islands NPA, number of visits to each station during the breeding season in 2002 and 2003, and the dominate habitat type at each station (continued)

Station Number	Island	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
44	Peddocks	340045	4683620	1	2	Shore
45	George's	341043	4687123	2	1	Grassland / Open
46	George's	341301	4687122	2	1	Grassland / Open
47	George's	341054	4686877	2	1	Developed
48	Lovell's	341050	4688378	2	1	Wetland
49	Lovell's	341049	4688103	2	1	Grassland / Open
50	Lovell's	341297	4687876	2	1	Shore
51	Lovell's	341294	4688126	2	1	Shore
52	Gallop's	340014	4687896	1	1	Developed
53	Gallop's	340324	4687891	1	1	Developed
69	Spectacle	336248	4688063	1	1	Developed
70	Spectacle	336054	4687882	2	1	Maritime Shrub
71	Spectacle	336317	4687862	2	1	Wetland
72	Spectacle	336301	4687639	2	2	Grassland / Open
73	Spectacle	336331	4687377	2	1	Grassland / Open
74	Spectacle	336310	4687140	2	1	Shore
75	Thompson	334796	4687366	2	1	Shore
76	Thompson	335054	4687377	2	1	Shore
77	Thompson	334555	4687118	2	1	Developed
78	Thompson	334794	4687128	2	1	Grassland / Open
79	Thompson	334310	4686879	1	1	Wetland
80	Thompson	334548	4686874	2	1	Grassland / Open
81	Thompson	334052	4686625	2	1	Grassland / Open
82	Thompson	334300	4686625	2	1	Grassland / Open
83	Thompson	334349	4686610	0	1	Salt Marsh
84	Thompson	333798	4686378	2	1	Shore
85	Thompson	334077	4686304	2	1	Salt Marsh
86	Thompson	334293	4686378	2	1	Maritime Shrub
87	Rainsford	339154	4686311	1	1	Deciduous Forest
88	Rainsford	338868	4686177	1	1	Grassland / Open
90	Langlee	344406	4680419	2	1	Deciduous Forest
91	Ragged	344068	4680071	2	1	Maritime Shrub
95	Snake	337050	4692379	1	1	Deciduous Forest
96	Deer	338863	4690896	1	1	Developed
97	Deer	339043	4690625	1	1	Developed
98	Deer	338586	4690397	1	1	Developed
99	Deer	338029	4691155	1	1	Grassland / Open
100	Deer	339049	4690385	1	1	Developed
101	Deer	338781	4690061	1	1	Developed
102	Deer	339067	4690133	1	1	Developed
103	Deer	339049	4689876	1	1	Developed
106	Button	344557	4679364	1	1	Shore

Survey Results

A total of 135 species were detected during VCP point count surveys, breeding waterbird surveys, and other waterbird surveys in BOHA during 2002 and 2003 (Table 2-2). Of these, 50 species (37%) are waterbirds, waterfowl, or shorebirds, while 85 species (63%) are primarily terrestrial.

Table 2-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Boston Harbor Islands NPA at point count stations surveyed during the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), breeding status for each species within the park, and the Partners in Flight (PIF) ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during waterbird surveys or other field surveys, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=232)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Red-throated Loon	0.01 \pm 0.01	1	R	-
Common Loon	-	-	R	-
Wilson's Storm-Petrel	-	-	R	-
Northern Gannet	-	-	R	-
Double-crested Cormorant	0.06 \pm 0.02	12	B	-
Great Blue Heron	0.01 \pm 0.01	2	L	-
Great Egret	0.01 \pm 0.01	4	B	-
Snowy Egret	0.04 \pm 0.02	7	B	-
Little Blue Heron	-	-	B	-
Tricolored Heron	-	-	M	-
Green Heron	0.03 \pm 0.02	1	B	-
Black-crowned Night-Heron	0.06 \pm 0.03	9	B	-
Glossy Ibis	-	-	B	-
Turkey Vulture	-	-	L	-
Canada Goose	0.17 \pm 0.11	4	B	-
Brant	-	-	R	-
Mute Swan	0.01 \pm 0.01	1	R	-
American Black Duck	0.17 \pm 0.06	12	B	IIC
Mallard	0.07 \pm 0.03	9	B	-
Common Eider	0.03 \pm 0.03	1	B	-
White-winged Scoter	-	-	R	-
Black Scoter	-	-	R	-
Oldsquaw	-	-	R	-
Bufflehead	-	-	R	-
Red-breasted Merganser	-	-	R	-
Osprey	-	-	L	-
Sharp-shinned Hawk	-	-	L	MA-SC
Cooper's Hawk	-	-	L	-
Red-tailed Hawk	-	-	L	-
American Kestrel	-	-	L	-
Peregrine Falcon	-	-	L	IIC, F-T, MA-E
Ring-necked Pheasant	0.02 \pm 0.01	4	B	-
Northern Bobwhite	0.01 \pm 0.01	1	B	-
Black-bellied Plover	-	-	M	-
Semipalmated Plover	-	-	M	-
Killdeer	0.01 \pm 0.01	4	L	-

Table 2-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Boston Harbor Islands NPA at point count stations surveyed during the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), breeding status for each species within the park, and the Partners in Flight (PIF) ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during waterbird surveys or other field surveys, and thus did not meet the requirements to be included in point count analyses (continued)

Species	$\bar{x} \pm SE$ (n=232)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
American Oystercatcher	0.11 ± 0.03	11	B	IA
Greater Yellowlegs	0.01 ± 0.01	1	M	-
Lesser Yellowlegs	-	-	M	-
Willet	0.01 ± 0.01	1	B	-
Spotted Sandpiper	0.05 ± 0.03	5	B	-
Whimbrel	-	-	M	-
Ruddy Turnstone	-	-	M	-
Sanderling	-	-	M	-
Semipalmated Sandpiper	-	-	M	-
Western Sandpiper	-	-	M	-
White-rumped Sandpiper	-	-	M	-
Purple Sandpiper	-	-	R	-
Dowitcher species	-	-	M	-
American Woodcock	-	-	L	IA
Laughing Gull	-	-	L	-
Bonaparte's Gull	-	-	L	-
Ring-billed Gull	-	-	L	-
Herring Gull	1.15 ± 0.35	27	B	-
Great Black-backed Gull	1.96 ± 0.71	21	B	-
Roseate Tern	-	-	L	F-E, MA-E
Common Tern	0.02 ± 0.01	5	B	MA-SC
Least Tern	0.01 ± 0.01	2	B	F-E, MA-SC
Razorbill	-	-	R	-
Black Guillemot	-	-	R	-
Rock Dove	0.03 ± 0.02	4	L	-
Mourning Dove	0.18 ± 0.03	29	B	-
Barn Owl	-	-	L	MA-SC
Great Horned Owl	0.01 ± 0.01	1	L	-
Chimney Swift	0.01 ± 0.01	2	L	IIA
Belted Kingfisher	0.01 ± 0.01	1	L	-
Red-bellied Woodpecker	-	-	L	-
Downy Woodpecker	0.06 ± 0.02	11	B	-
Northern Flicker	0.04 ± 0.01	11	L	-
Eastern Wood-Pewee	0.01 ± 0.01	2	L	IIA
Willow Flycatcher	0.07 ± 0.02	12	B	-

Table 2-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Boston Harbor Islands NPA at point count stations surveyed during the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), breeding status for each species within the park, and the Partners in Flight (PIF) ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during waterbird surveys or other field surveys, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm SE$ (n=232)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Eastern Phoebe	0.01 \pm 0.01	2	L	-
Great Crested Flycatcher	0.01 \pm 0.01	4	L	-
Eastern Kingbird	0.03 \pm 0.01	10	L	-
Warbling Vireo	0.03 \pm 0.01	7	L	-
Red-eyed Vireo	0.03 \pm 0.01	7	L	-
Blue Jay	0.07 \pm 0.02	15	B	-
American Crow	0.24 \pm 0.04	37	B	-
Fish Crow	-	-	L	-
Tree Swallow	0.03 \pm 0.01	4	L	-
North Rough-winged Swallow	0.04 \pm 0.02	6	L	-
Cliff Swallow	-	-	L	-
Barn Swallow	0.14 \pm 0.06	13	B	-
Black-capped Chickadee	0.19 \pm 0.05	21	B	-
Tufted Titmouse	0.06 \pm 0.02	7	B	-
Red-breasted Nuthatch	-	-	R	-
White-breasted Nuthatch	0.03 \pm 0.01	9	L	-
Brown Creeper	-	-	L	-
Carolina Wren	0.16 \pm 0.03	26	B	-
House Wren	0.02 \pm 0.01	5	L	-
Ruby-crowned Kinglet	-	-	R	-
Swainson's Thrush	-	-	M	-
Wood Thrush	-	-	L	IA
American Robin	0.33 \pm 0.05	33	B	-
Gray Catbird	0.75 \pm 0.07	60	B	-
Northern Mockingbird	0.07 \pm 0.02	18	B	-
Brown Thrasher	0.01 \pm 0.01	1	L	-
European Starling	0.63 \pm 0.19	28	B	-
Cedar Waxwing	0.16 \pm 0.04	24	B	-
Nashville Warbler	-	-	M	-
Northern Parula	0.01 \pm 0.01	1	M	MA-T
Yellow Warbler	0.77 \pm 0.06	65	B	-
Chestnut-sided Warbler	-	-	L	-
Magnolia Warbler	0.01 \pm 0.01	1	M	-
Cape May Warbler	-	-	M	-
Black-throated Blue Warbler	-	-	M	IB
Yellow-rumped Warbler	-	-	R	-

Table 2-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Boston Harbor Islands NPA at point count stations surveyed during the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), breeding status for each species within the park, and the Partners in Flight (PIF) ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during waterbird surveys or other field surveys, and thus did not meet the requirements to be included in point count analyses (continued)

Species	$\bar{x} \pm SE$ (n=232)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Black-throated Green Warbler	-	-	M	-
Pine Warbler	0.01 \pm 0.01	1	L	-
Prairie Warbler	-	-	M	IA
Blackpoll Warbler	0.01 \pm 0.01	2	M	-
Black-and-White Warbler	-	-	M	IIA
American Redstart	0.07 \pm 0.02	13	B	-
Worm-eating Warbler	0.01 \pm 0.01	1	M	IA
Northern Waterthrush	-	-	L	-
Common Yellowthroat	0.33 \pm 0.04	55	B	-
Canada Warbler	-	-	M	IIC
Chipping Sparrow	0.01 \pm 0.01	1	L	-
Savannah Sparrow	0.01 \pm 0.01	1	L	-
Song Sparrow	1.56 \pm 0.10	85	B	-
Swamp Sparrow	-	-	L	-
White-throated Sparrow	-	-	R	-
Dark-eyed Junco	-	-	R	-
Northern Cardinal	0.26 \pm 0.04	39	B	-
Indigo Bunting	0.01 \pm 0.01	2	L	-
Bobolink	0.12 \pm 0.04	7	B	III
Red-winged Blackbird	1.28 \pm 0.16	62	B	-
Common Grackle	0.49 \pm 0.08	46	B	-
Brown-headed Cowbird	0.06 \pm 0.02	11	B	-
Orchard Oriole	0.03 \pm 0.01	5	L	-
Baltimore Oriole	0.06 \pm 0.02	13	B	IA
Purple Finch	-	-	R	IIA
House Finch	0.07 \pm 0.02	15	B	-
American Goldfinch	0.30 \pm 0.05	38	B	-
House Sparrow	0.14 \pm 0.05	11	B	-

^a **Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park;

L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown, R – local resident outside of the breeding season, M - migrant

^b **PIF Priority Species Designations:** IA - High Continental Priority, High Regional Responsibility; IB - High Continental Priority, Low Regional Responsibility; IIA - High Regional Concern; IIB – High Regional Responsibility; IIC – High Regional Threats; III – U.S. National Watch List; F – Federally Listed; MA – Listed in the State of Massachusetts; E- Endangered, T- Threatened, SC – Species of Concern

Of the 50 aquatic or water-dependent species, 18 (36%) are known to breed in the park (breeding species shown by island; Table 2-3), 11 (24%) are species of shorebirds that migrate through the park during spring or fall, and the remaining 21 (42%) are local or winter residents that regularly use the park during some portion of the year, but do not breed there.

Table 2-3. Interannual variation in the number of breeding pairs of waterbirds surveyed on islands in the Boston Harbor Islands NPA from 2002 and 2003. Islands that were not surveyed during a given year are depicted with a dash (-).

Species	Year	Bumpkin	Button	Calf	Gallops	Grape	Great Brewster	Green	Hangman	Langlee	Little Calf	Lovells	Middle Brewster	Outer Brewster	Peddocks	Ragged	Rainsford	Sarah	Shag	Sheep	Snake	Spectacle	Thompson	Worlds End	Grand Total
Double-crested Cormorant	2002	0	0	2	0	0	0	256	0	0	376	0	842	131	0	0	0	254	171	0	0	0	0	0	2032
	2003	0	0	55	0	0	0	187	0	0	157	0	714	125	0	0	0	80	128	0	0	0	0	0	1446
Great Egret	2002	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	6	0	0	0	0	0	0	8	
	2003	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	10	
Snowy Egret	2002	0	0	8	0	0	0	0	0	0	0	0	13	0	0	0	35	0	10	0	0	0	0	66	
	2003	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	17	0	8	0	0	0	0	58	
Little Blue Heron	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	
Green Heron	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	
	2003	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4	
Black-crowned Night-Heron	2002	0	0	13	0	0	0	0	0	0	0	-	21	0	0	0	86	0	11	1	0	3	0	135	
	2003	0	0	24	0	0	0	0	0	0	0	14	66	0	0	0	87	0	3	0	0	0	0	194	
Glossy Ibis	2002	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	1	0	0	0	0	9	
	2003	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	12	
Canada Goose	2002	0	0	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	1	0	16	
	2003	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0	8	0	0	0	0	13	
Mallard	2002	0	0	0	0	0	1	0	0	0	0	0	1	2	5	2	0	0	2	1	0	2	2	18	
	2003	2	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	7	
American Black Duck	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4	
	2003	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	
Common Eider*	*2002	0	0	15	0	0	3	6	0	0	6	0	4	4	0	0	0	0	0	0	0	0	0	38	
	2003	0	0	43	0	0	0	9	0	0	0	0	13	8	0	0	0	0	0	0	0	0	0	73	
American Oystercatcher	2002	1	0	1	1	0	1	0	1	0	0	1	1	0	1	0	2	1	0	1	1	1	0	15	
	2003	0	0	1	1	0	1	0	1	0	0	0	1	0	2	0	2	2	0	1	2	1	1	16	
Spotted Sandpiper	2002	0	0	4	0	0	3	0	0	1	0	0	0	1	0	0	11	1	0	0	1	1	0	23	
	2003	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	6	0	0	0	1	0	0	9	

Table 2-3. Interannual variation in the number of breeding pairs of waterbirds surveyed on islands in the Boston Harbor Islands NPA from 2002 and 2003. Islands that were not surveyed during a given year are depicted with a dash (-) (continued)

Species	Year	Bumpkin	Button	Calf	Gallops	Grape	Great Brewster	Green	Hangman	Langlee	Little Calf	Lovells	Middle Brewster	Outer Brewster	Peddocks	Ragged	Rainsford	Sarah	Shag	Sheep	Snake	Spectacle	Thompson	Worlds End	Grand Total
Willet	2002	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3
	2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3
Great Black-backed Gull	2002	0	0	62	53	0	24	37	106	1	36	0	47	52	0	0	3	90	3	6	0	0	0	0	520
	2003	0	0	14	32	0	1	26	45	0	14	0	18	17	0	0	1	8	1	14	0	0	0	0	191
Herring Gull	2002	0	6	145	28	0	210	35	8	0	2	0	223	203	0	2	0	154	5	171	0	0	0	0	1192
	2003	0	13	64	138	0	56	16	18	0	0	0	33	76	0	0	20	74	0	144	0	0	0	0	652
Common Tern	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15	
	2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	12	
Least Tern	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	0	41	
	2003	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	0	0	0	0	0	0	114	

*Common Eider nest counts were estimated from chicks seen on the water at an average of 4.5 chicks per nest in 2002.

In its Landbird Conservation Plan for Physiographic Area 9, Southern New England (Dettmers and Rosenberg 2000), Partners In Flight (PIF) lists the American Oystercatcher as a species of high continental conservation priority with a high level of responsibility falling on the Southern New England region. Approximately 15 pair of American Oystercatchers were detected annually during surveys in BOHA (Table 2-3). In addition American Black Ducks, a PIF species listed as experiencing high regional threats, also nests in the park.

Other waterbird species of conservation interest nesting in Boston Harbor include both Common and Least Terns. Both species are listed as Species of Special Concern in the State of Massachusetts (<http://www.state.ma.us/dfwele/dfw/nhsp/nhrare.htm>), while interior populations of the Least Tern (i.e., along the Mississippi River) are also federally listed as Endangered. Although only a single colony of each species currently exists within the park, a large Common Tern colony (approximately 350 nesting adults) was documented on a nesting platform just outside park boundaries in 2003, and colony surveys for Least Terns found a moderately sized colony on Rainsford Island during both years (from 41 nests in 2002 to 114 nests in 2003) suggesting that park habitat may be suitable to support larger colony sizes. Roseate Terns, both Federally and State listed as Endangered, were observed feeding off of Thompson Island in BOHA in 2002, but were never recorded nesting in the park.

Preliminary waterbird surveys in BOHA in 2001 documented breeding Common Eider in the Outer Islands, and further surveys in 2002 and 2003 documented over 70 pairs, primarily on Calf and Middle Brewster Islands (Table 2-3). We detected 8 small colonial wading bird colonies, with a total of six species (Table 2-3).

Of the 135 species observed in BOHA, 75 (56%) were detected during VCP point count surveys. Breeding species were defined as those species with a relative abundance of > 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g. visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, 45 species (60%) detected during VCP surveys breed within the park.

Only 5 species (7%)(Gray Catbird, Yellow Warbler, Common Yellowthroat, Song Sparrow, and Red-winged Blackbird) were detected at $> 50\%$ of the sampling stations within the park (Table 2-2). Of these most frequently detected species, Song Sparrows ($\bar{x} = 1.56$, SE = 0.10), Red-winged Blackbirds ($\bar{x} = 1.28$, SE = 0.16), and Yellow Warblers ($\bar{x} = 0.77$, SE = 0.06) had the highest overall relative abundances. Great Black-backed Gulls ($\bar{x} = 1.96$, SE = 0.71) and Herring Gulls ($\bar{x} = 1.15$, SE = 0.35) were detected in high numbers, but on fewer islands.

Of the terrestrial species breeding in the park, only two are listed by PIF as conservation priorities for the region (Dettmers and Rosenberg 2000). Baltimore Orioles are listed as a high continental conservation priority, with a high level of responsibility falling on the

Southern New England region. This species is a neotropical migrant that nests in mature deciduous forests throughout the eastern United States (DeGraff and Rappole 1995). Although common in Southern New England, Baltimore Orioles are experiencing severe population declines (Sauer et al. 2003). Bobolinks, a grassland specialist that rely primarily on hayfields and actively maintained grasslands, are listed by PIF as an additional watch list species (DeChant et al. 1999). In Boston Harbor, both Baltimore Orioles and Bobolinks were often detected at a few specific point count stations in grassland habitat at World's End, one of the only portions of the park that is located on the mainland.

An additional 14 species (10% of the total) that we rarely observed are listed as species of conservation concern by the Federal government, the State of Massachusetts, or Partners in Flight (Table 2-2). Although these species are unlikely to breed in BOHA, they utilize habitats within the park for foraging and resting during migration and in the winter. Caution should be used when evaluating the importance of the park to these species based on this study because point counts during the breeding season do not adequately sample migrants, raptors, or very rare species.

Of the 75 species detected during VCP surveys, 52 (69%) were detected at stations located primarily in grassland / open habitat (n=21), 40 (53%) along the shore (n=16), 37 (49%) in developed areas (n=15), 34 (45%) at deciduous forested stations (n=10), 36 (48%) at maritime shrub stations (n=10), 43 (57%) at freshwater wetland stations (n=7), 17 (23%) at salt marsh stations (n=2), and 12 (16%) at stations located in pine forest (n=1). Given the juxtaposition of habitat types in the field and the mobility of avian species, it may not be surprising that many species were detected in multiple habitat types.

Although the number of sampling stations (and therefore survey effort) varied by habitat type, it is interesting to note the high number of species detected in freshwater wetlands, especially given their limited extent in BOHA (Table 2-4). With the exception of Red-winged Blackbird (which was not detected in the pine forest), the 5 most frequently occurring species (Gray Catbird, Yellow Warbler, Common Yellowthroat, Song Sparrow, and Red-winged Blackbird) were habitat generalists that were detected in all habitat types.

Table 2-4. Habitat associations of species detected during VCP point count surveys.

Species	Grassland Stations (N=21)	Shore Stations (N=16)	Developed Stations (N=15)	Deciduous Forest Stations (N=10)	Maritime Shrub Stations (N=10)	Freshwater Wetland Stations (N=7)	Salt Marsh Stations (N=2)	Pine Forest Stations (N=1)
Red-throated Loon	-	-	-	-	X	-	-	-
Double-crested Cormorant	-	X	X	-	-	X	X	-
Great Blue Heron	X	-	-	-	-	-	X	-
Great Egret	X	-	-	-	-	X	-	-
Snowy Egret	X	X	-	X	X	X	-	-
Green Heron	-	-	-	-	X	-	-	-
Black-crowned Night-Heron	X	X	-	X	X	X	-	-
Canada Goose	-	X	-	-	-	X	-	-
Mute Swan	-	-	-	-	-	X	-	-
American Black Duck	-	X	X	-	-	X	X	-
Mallard	X	X	X	-	X	X	-	-
Common Eider	-	X	-	-	-	-	-	-
Ring-necked Pheasant	X	-	X	-	-	-	-	-
Northern Bobwhite	-	X	-	-	-	-	-	-
Killdeer	X	X	-	-	-	X	-	-
American Oystercatcher	-	X	X	X	X	-	-	-
Greater Yellowlegs	-	-	-	-	X	-	-	-
Willet	-	-	-	X	-	-	-	-
Spotted Sandpiper	X	X	-	-	-	-	-	-
Herring Gull	X	X	X	-	-	X	-	-
Great Black-backed Gull	X	X	X	-	-	-	-	-
Common Tern	X	X	-	X	-	-	-	-
Least Tern	-	-	-	-	-	X	-	-
Rock Dove	-	-	X	-	-	-	-	-
Mourning Dove	X	X	X	X	X	X	X	-
Great Horned Owl	-	-	-	-	X	-	-	-
Chimney Swift	-	-	-	-	-	X	-	-

Table 2-4. Habitat associations of species detected during VCP point count surveys (continued).

Species	Grassland Stations (N=21)	Shore Stations (N=16)	Developed Stations (N=15)	Deciduous Forest Stations (N=10)	Maritime Shrub Stations (N=10)	Freshwater Wetland Stations (N=7)	Salt Marsh Stations (N=2)	Pine Forest Stations (N=1)
Belted Kingfisher	-	-	-	-	-	X	-	-
Downy Woodpecker	X	-	X	X	-	X	-	-
Northern Flicker	X	X	-	X	X	X	-	-
Eastern Wood-Pewee	-	-	X	-	-	X	-	-
Willow Flycatcher	X	X	-	X	X	X	-	-
Eastern Phoebe	X	-	X	-	-	-	-	-
Great Crested Flycatcher	X	X	-	X	-	-	-	-
Eastern Kingbird	X	-	X	-	X	-	-	X
Warbling Vireo	X	-	-	-	-	X	-	-
Red-eyed Vireo	X	-	X	X	-	X	-	-
Blue Jay	X	-	X	X	-	X	-	-
American Crow	X	X	X	X	X	X	X	X
Tree Swallow	X	X	-	-	-	X	-	-
North Rough-winged Swallow	-	X	X	-	-	-	-	-
Barn Swallow	X	X	X	-	X	X	-	X
Black-capped Chickadee	X	-	X	X	X	X	-	X
Tufted Titmouse	X	-	-	X	-	X	-	-
White-breasted Nuthatch	X	-	-	X	X	X	-	-
Carolina Wren	X	X	X	X	X	X	-	-
House Wren	X	-	-	-	X	-	-	-
American Robin	X	X	X	X	X	X	X	X
Gray Catbird	X	X	X	X	X	X	X	X
Northern Mockingbird	X	X	X	-	-	-	X	-
Brown Thrasher	X	-	-	-	-	-	-	-
European Starling	X	X	X	-	-	X	X	-
Cedar Waxwing	X	X	X	X	X	X	-	-
Northern Parula	X	-	-	-	-	-	-	-

Table 2-4. Habitat associations of species detected during VCP point count surveys (continued).

Species	Grassland Stations (N=21)	Shore Stations (N=16)	Developed Stations (N=15)	Deciduous Forest Stations (N=10)	Maritime Shrub Stations (N=10)	Freshwater Wetland Stations (N=7)	Salt Marsh Stations (N=2)	Pine Forest Stations (N=1)
Yellow Warbler	X	X	X	X	X	X	X	X
Magnolia Warbler	-	-	-	-	X	-	-	-
Pine Warbler	-	-	-	-	-	X	-	-
Blackpoll Warbler	-	-	-	-	X	-	-	-
American Redstart	X	X	X	X	X	X	-	X
Worm-eating Warbler	-	-	-	X	-	-	-	-
Common Yellowthroat	X	X	X	X	X	X	X	X
Chipping Sparrow	X	X	-	-	-	-	-	-
Savannah Sparrow	X	-	-	-	-	-	-	-
Song Sparrow	X	X	X	X	X	X	X	X
Northern Cardinal	X	X	X	X	X	X	X	X
Indigo Bunting	-	-	-	X	X	-	-	-
Bobolink	X	-	-	X	X	-	-	-
Red-winged Blackbird	X	X	X	X	X	X	X	-
Common Grackle	X	X	X	X	X	X	X	X
Brown-headed Cowbird	X	X	X	-	X	X	X	-
Orchard Oriole	X	-	-	-	-	-	-	-
Baltimore Oriole	X	-	X	X	X	X	-	-
House Finch	X	X	X	X	X	-	-	-
American Goldfinch	X	X	X	X	X	X	X	-
House Sparrow	X	X	X	X	-	-	-	-

Surprisingly, the stations with the highest mean number of individuals detected were located in developed areas at the Deer Island treatment facility (sampling stations 96-103)(Figure 2-2). However, few species were detected at these stations (Figure 2-3). The highest species richness occurred on the largest islands, Peddocks (stations 29-44) and Thompson (stations 75-86), and at World's End (stations 8-22)(Figure 2-3). The relative abundance of each species at each sampling station is given in Appendix 2-A.

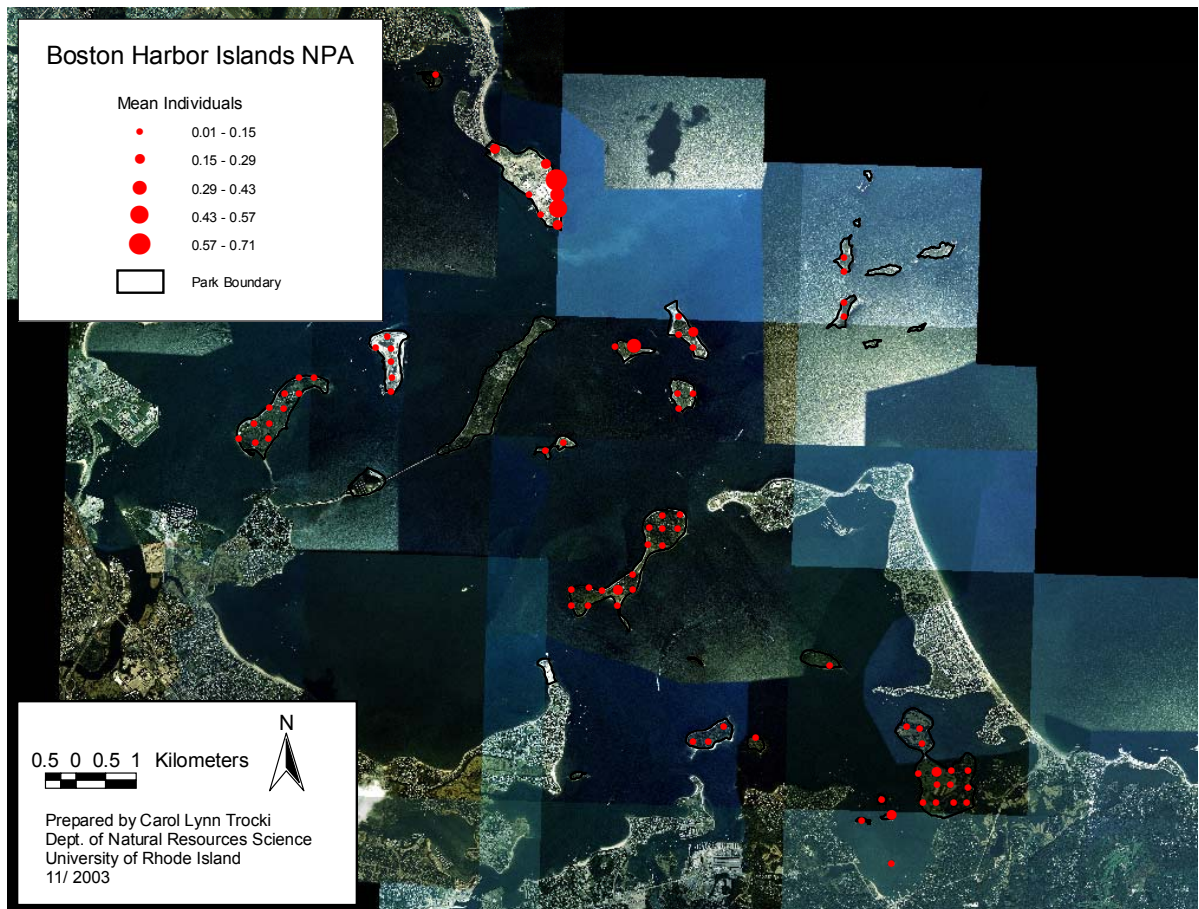


Figure 2-2. The mean number of individuals (all species combined) detected at each sampling station in Boston Harbor Islands NPA during VCP surveys in 2002 and 2003.

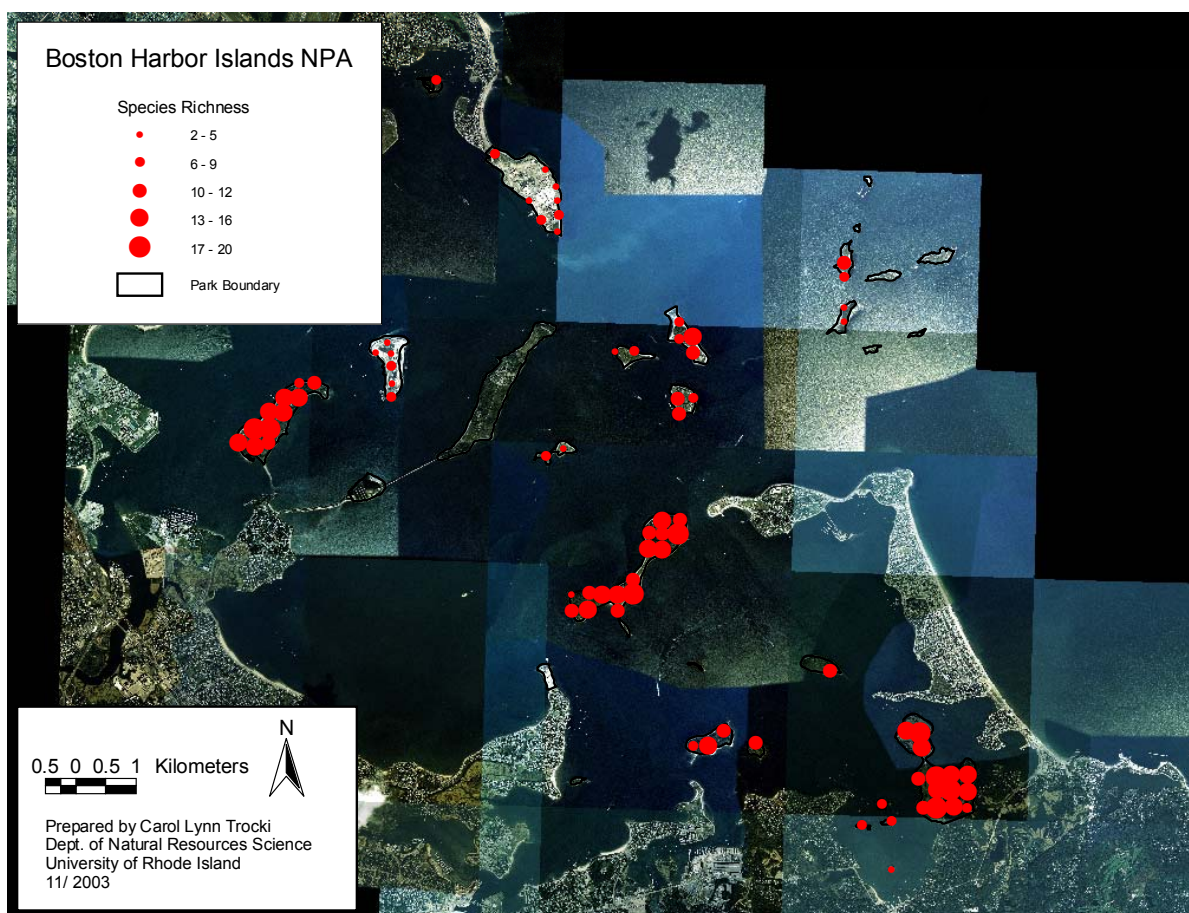


Figure 2-3. The total number of species detected at each sampling station in Boston Harbor Islands NPA during VCP surveys in 2002 and 2003.

Chapter 3

Avian surveys in Northeast Temperate Network Parks:

Minute Man National Historical Park (MIMA)

Background

Congress established Minute Man National Historical Park (MIMA) in 1959 to preserve historic sites, structures, properties and landscapes associated with the opening of the American Revolution (Annual Performance Plan for Minute Man National Historical Park 2003). MIMA is designed to present a historical representation of the colonial struggle for freedom.

The park encompasses 967 acres, and is located in Concord, Lincoln, and Lexington, Massachusetts. Forests dominate the landscape, covering approximately 500 acres, which includes about 200 acres of forested wetland. Non-forested wetlands, including several ponds, cover approximately 180 acres. Meadows and fields account for an additional 250 acres of the park's holdings, including approximately 100 acres that are farmed under the park's agricultural leasing program. Shrubland also is present at the park, particularly at the interface of fields and forests. The remainder of the park includes some developed areas (i.e., roads, parking lots, and buildings) (<http://www.nps.gov/mima/pphtml/nature.html>). A recent avian survey at MIMA, conducted by Windmiller and Walton in 1992, detected 60 breeding species in the park.

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at MIMA in 2002 and 2003. Prior to the 2002 breeding season, 59 randomly-generated point count stations were placed within park boundaries (Figure 3-1). These 59 stations were each surveyed once during the breeding season in 2002, and again in 2003, with the exception of 2 stations sampled only in 2002 (Table 3-1).

Thirty-five of the point count stations (59%) were located in forested habitat, 17 stations (29%) in grassland, 4 (7%) exclusively in wetlands, 2 in forested wetlands (3%), and 2 (3%) in developed areas (Table 3-1).

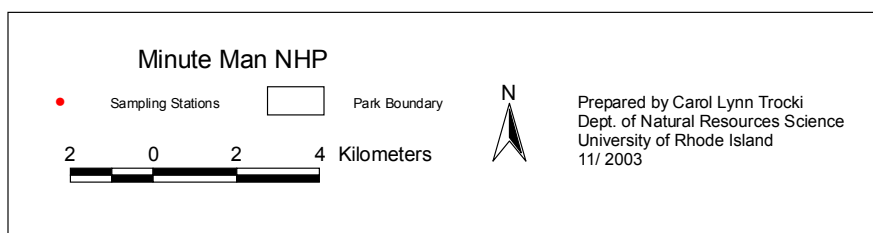
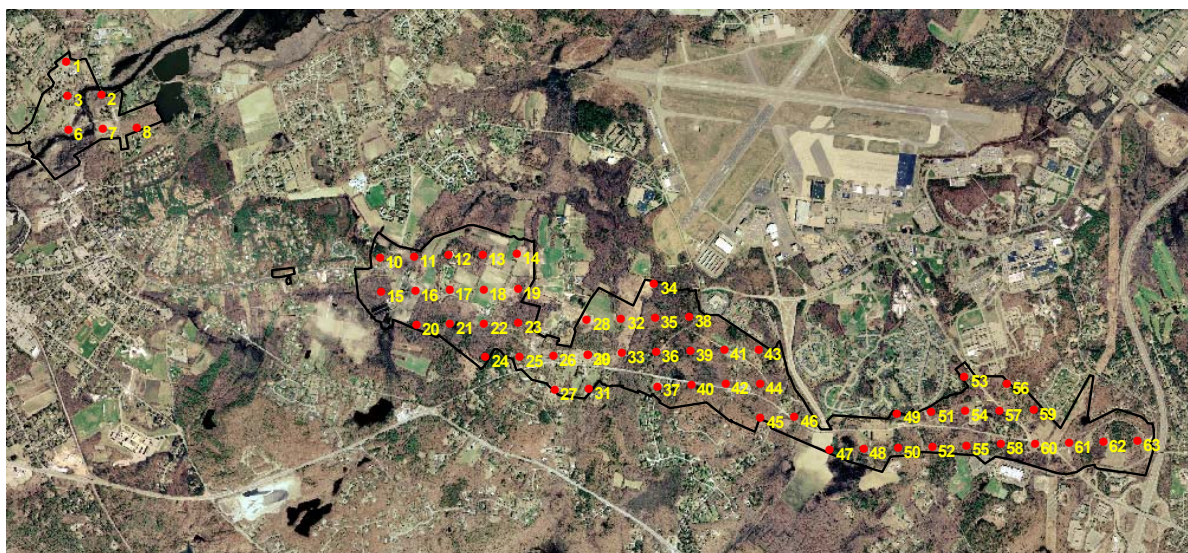


Figure 3-1. Locations of point count stations in Minute Man National Historical Park (MIMA) surveyed during the breeding season in 2002 and 2003.

Table 3-1. UTM coordinates of point count stations in Minute Man NHP, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat types at each station.

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
1	306588	4704969	1	1	Grassland
2	306838	4704719	1	1	Forest, Wetland
3	306588	4704719	1	1	Developed
6	306588	4704469	1	1	Grassland, Wetland
7	306838	4704469	1	1	Grassland
8	307088	4704469	1	1	Forest
10	308838	4703469	1	1	Forest
11	309088	4703469	1	0	Grassland, Wetland
12	309338	4703469	1	1	Forest
13	309588	4703469	1	1	Forest
14	309838	4703469	1	1	Grassland
15	308838	4703219	1	1	Forest, Wetland
16	309088	4703219	1	1	Grassland
17	309338	4703219	1	1	Forest
18	309588	4703219	1	1	Grassland
19	309838	4703219	1	1	Grassland
20	309088	4702969	1	0	Forest
21	309338	4702969	1	1	Forest
22	309588	4702969	1	1	Grassland
23	309838	4702969	1	1	Forest
24	309588	4702719	1	1	Forest
25	309838	4702719	1	1	Forest
26	310088	4702719	1	1	Forest, Grassland
27	310088	4702469	1	1	Grassland
28	310338	4702969	1	1	Wetland
29	310338	4702719	1	1	Grassland
31	310338	4702469	1	1	Grassland
32	310588	4702969	1	1	Wetland
33	310588	4702719	1	1	Wetland
34	310838	4703219	1	1	Wetland
35	310838	4702969	1	1	Forest
36	310838	4702719	1	1	Forest
37	310838	4702469	1	1	Forest
38	311088	4702969	1	1	Forest
39	311088	4702719	1	1	Forest
40	311088	4702469	1	1	Forest
41	311338	4702719	1	1	Grassland
42	311338	4702469	1	1	Developed
43	311588	4702719	1	1	Forest
44	311588	4702469	1	1	Forest
45	311588	4702219	1	1	Forest

Table 3-1. UTM coordinates of point count stations in Minute Man NHP, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat types at each station (continued).

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
46	311838	4702219	1	1	Forest
47	312088	4701969	1	1	Grassland, Forest
48	312338	4701969	1	1	Forest
49	312588	4702219	1	1	Forest
50	312588	4701969	1	1	Forest
51	312838	4702219	1	1	Forest
52	312838	4701969	1	1	Forest
53	313088	4702469	1	1	Forest
54	313088	4702219	1	1	Grassland
55	313088	4701969	1	1	Forest
56	313396	4702415	1	1	Forest
57	313338	4702219	1	1	Forest
58	313338	4701969	1	1	Forest
59	313588	4702219	1	1	Forest
60	313588	4701969	1	1	Grassland, Forest
61	313838	4701969	1	1	Forest
62	314088	4701969	1	1	Forest
63	314338	4701969	1	1	Forest

Survey Results

A total of 62 species were detected at MIMA (Table 3-2), of which 56 species (90%) were detected during VCP surveys. Breeding species were defined as those species with a relative abundance of > 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g. visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, 39 species (70%) detected during VCP surveys breed within the park. Of the additional 6 species detected outside of VCP surveys, five species may breed within the park based on available habitat and current breeding ranges (National Geographic 1999). However, it is unlikely that Great Blue Herons breed within the park given our coverage of the area and the ease with which heron colonies are typically detected.

Only six species detected during VCP surveys (11 %) were detected at $> 50\%$ of the sampling stations within the park (Table 3-2). Of these most frequently detected species, American Robins ($\bar{x} = 0.81$, $SE = 0.11$), Song Sparrows ($\bar{x} = 0.66$, $SE = 0.08$), and Blue Jays ($\bar{x} = 0.53$, $SE = 0.07$) had the highest overall relative abundances.

Of the species breeding in the park, nine (15%) are listed as priority species in the Partners In Flight (PIF) Landbird Conservation Plan for Physiographic Area 9, Southern New England (Dettmers and Rosenberg 2000)(Table 3-2). Wood Thrush, Blue-winged Warbler, Scarlet Tanager, and Baltimore Oriole are all listed by PIF as a high continental conservation priority with a high level of responsibility falling on the Southern New England region. Wood Thrush, Scarlet Tanager, and Baltimore Oriole are all neotropical migrants that breed in mature deciduous and mixed forests (DeGraaf and Rappole 1995), and Wood Thrush is considered by PIF to be a focal species for conservation efforts in these habitats (Dettmers and Rosenberg 2000). Blue-winged Warblers are considered a focal species associated with early-successional habitat (Dettmers and Rosenberg 2000).

Eastern Wood-Pewee, Eastern Towhee, and Rose-breasted Grosbeak are all listed by PIF as a high continental conservation priority, but with low responsibility for conservation falling on the Southern New England region. Eastern Wood-Pewee and Rose-breasted Grosbeak are both associated with mature deciduous and mixed forests, while Eastern Towhee is considered a focal species for early-successional habitat (Dettmers and Rosenberg 2000).

Other species of conservation interest occurring at MIMA include Chimney Swift and Bobolink. Chimney Swifts were observed on six occasions in 2002 and 10 occasions in 2003, suggesting that they likely breed in the area, although their overall relative abundance did not meet the requirements to be classified as breeding within the park. Chimney Swifts generally rely on human structures for nesting (DeGraaf and Rappole 1995), so it is possible that park buildings and historic structures are providing nesting habitat. A single Bobolink was detected at station 14 in 2003, suggesting that while Bobolinks might not currently breed in MIMA, these fields may provide suitable habitat.

Bobolinks are grassland specialists that rely primarily on hayfield habitat and actively maintained agricultural areas (DeChant et al 1999).

Table 3-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at point count stations in Minute Man NHP during the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), each species' breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=116)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Great Blue Heron	-	-	L	-
Green Heron	-	-	L	-
Canada Goose	-	-	L	-
Mallard	0.01 \pm 0.01	2	L	-
Broad-winged Hawk	0.01 \pm 0.01	2	L	-
Red-tailed Hawk	0.02 \pm 0.01	3	L	-
American Kestrel	-	-	L	-
Killdeer	0.09 \pm 0.05	5	B	-
Rock Dove	0.05 \pm 0.05	2	B	-
Mourning Dove	0.24 \pm 0.06	25	B	-
Chimney Swift	0.04 \pm 0.04	3	L	IIA
Red-bellied Woodpecker	0.03 \pm 0.02	5	L	-
Downy Woodpecker	0.10 \pm 0.03	17	B	-
Northern Flicker	0.06 \pm 0.02	10	B	-
Eastern Wood-Pewee	0.06 \pm 0.03	10	B	IIA
Alder Flycatcher	0.03 \pm 0.01	5	L	-
Eastern Phoebe	0.16 \pm 0.04	25	B	-
Great Crested Flycatcher	0.01 \pm 0.01	2	L	-
Eastern Kingbird	0.08 \pm 0.03	7	B	-
Warbling Vireo	0.03 \pm 0.02	7	L	-
Red-eyed Vireo	0.12 \pm 0.03	20	B	-
Blue Jay	0.53 \pm 0.07	58	B	-
American Crow	0.30 \pm 0.07	36	B	-
Tree Swallow	-	-	L	-
Barn Swallow	-	-	L	-
Black-capped Chickadee	0.51 \pm 0.08	63	B	-
Tufted Titmouse	0.51 \pm 0.08	47	B	-
White-breasted Nuthatch	0.34 \pm 0.08	36	B	-
Carolina Wren	0.01 \pm 0.01	2	L	-
House Wren	0.07 \pm 0.03	10	B	-
Blue-gray Gnatcatcher	0.02 \pm 0.01	3	L	-
Eastern Bluebird	0.01 \pm 0.01	2	L	-
Wood Thrush	0.20 \pm 0.05	24	B	IA
American Robin	0.81 \pm 0.11	69	B	-
Gray Catbird	0.47 \pm 0.08	47	B	-
Northern Mockingbird	0.10 \pm 0.04	12	B	-

Table 3-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at point count stations in Minute Man NHP during the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), each species' breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm SE$ (n=116)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
European Starling	0.20 ± 0.10	12	B	-
Cedar Waxwing	0.10 ± 0.05	10	B	-
Blue-winged Warbler	0.06 ± 0.03	8	B	IA
Yellow Warbler	0.41 ± 0.08	36	B	-
Magnolia Warbler	0.01 ± 0.01	2	M	-
Pine Warbler	0.19 ± 0.05	22	B	-
Black-and-White Warbler	0.04 ± 0.02	8	L	-
American Redstart	0.04 ± 0.02	8	L	-
Ovenbird	0.09 ± 0.03	14	B	-
Common Yellowthroat	0.41 ± 0.06	54	B	-
Scarlet Tanager	0.08 ± 0.03	8	B	IA
Eastern Towhee	0.05 ± 0.03	5	B	IIA
Chipping Sparrow	0.16 ± 0.04	27	B	-
Song Sparrow	0.66 ± 0.08	53	B	-
Swamp Sparrow	0.04 ± 0.02	7	L	-
Northern Cardinal	0.47 ± 0.07	58	B	-
Rose-breasted Grosbeak	0.06 ± 0.03	10	B	IIA
Indigo Bunting	0.03 ± 0.02	7	L	-
Bobolink	0.01 ± 0.01	2	L	III
Red-winged Blackbird	0.77 ± 0.17	39	B	-
Common Grackle	0.07 ± 0.03	10	B	-
Brown-headed Cowbird	0.09 ± 0.05	8	B	-
Baltimore Oriole	0.20 ± 0.05	27	B	IA
House Finch	0.16 ± 0.05	17	B	-
American Goldfinch	0.35 ± 0.08	37	B	-
House Sparrow	0.35 ± 0.14	12	B	-

^a **Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park;

L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown

^b **PIF Priority Species Designations:** IA - High Continental Priority, High Regional Responsibility; IB - High Continental Priority, Low Regional Responsibility; IIA - High Regional Concern; III – U. S. National Watch List

Of the 56 species detected during VCP surveys, 48 (86%) were detected at stations located primarily in forested habitat (N=35), 44 (79%) at grassland stations (N=19), 21 (38%) at wetland stations (N=3), 19 (34%) at forested wetland stations (N=2), and 18 (32%) at stations located in developed habitat (N=2)(Table 3-3). Given the juxtaposition of habitat types and the mobility of avian species, it may not be surprising that many species were detected in multiple habitat types. However, a number of forest species, including Eastern Wood-Pewee, Ovenbird, and Scarlet Tanager were only detected at stations located primarily within forested habitat. Swamp Sparrow, a marsh specialist was only detected at stations in wetland habitat.

Table 3-3. Habitat associations of species detected during point count surveys in MIMA.

Species	Forested Stations (n=35)	Grassland Stations (n=19)	Wetland Stations (n=3)	Forested Wetland Stations (n=2)	Developed Stations (n=2)
Mallard	X	-	-	-	-
Broad-winged Hawk	X	-	-	-	-
Red-tailed Hawk	X	X	-	-	-
Killdeer	X	X	-	-	-
Rock Dove	-	X	-	-	-
Mourning Dove	X	X	-	X	X
Chimney Swift	X	-	-	-	-
Red-bellied Woodpecker	X	X	-	-	-
Downy Woodpecker	X	X	-	X	-
Northern Flicker	X	X	-	-	-
Eastern Wood-Pewee	X	-	-	-	-
Alder Flycatcher	-	X	X	-	-
Eastern Phoebe	X	X	X	X	X
Great Crested Flycatcher	-	-	X	-	-
Eastern Kingbird	X	X	X	-	-
Warbling Vireo	-	X	X	-	-
Red-eyed Vireo	X	X	-	X	X
Blue Jay	X	X	-	X	-
American Crow	X	X	X	X	X
Black-capped Chickadee	X	X	X	X	X
Tufted Titmouse	X	X	X	X	-
White-breasted Nuthatch	X	X	X	-	X
Carolina Wren	X	-	-	-	-
House Wren	X	X	-	-	-
Blue-gray Gnatcatcher	-	X	-	-	-
Eastern Bluebird	-	X	-	-	-
Wood Thrush	X	X	-	-	X
American Robin	X	X	-	X	X
Gray Catbird	X	X	X	X	-
Northern Mockingbird	X	X	-	-	X
European Starling	X	X	-	-	X
Cedar Waxwing	X	X	-	-	-
Blue-winged Warbler	X	X	-	-	-
Yellow Warbler	X	X	X	X	X
Magnolia Warbler	X	-	-	-	-
Pine Warbler	X	X	-	-	-
Black-and-White Warbler	X	X	-	-	-
American Redstart	X	X	-	X	-
Ovenbird	X	-	-	-	-
Common Yellowthroat	X	X	X	X	X

Table 3-3. Habitat associations of species detected during point count surveys in MIMA (continued).

Species	Forested Stations (n=35)	Grassland Stations (n=19)	Wetland Stations (n=3)	Forested Wetland Stations (n=2)	Developed Stations (n=2)
Scarlet Tanager	X	-	-	-	-
Eastern Towhee	X	-	-	-	-
Chipping Sparrow	X	X	X	-	X
Song Sparrow	X	X	X	X	-
Swamp Sparrow	-	-	X	-	-
Northern Cardinal	X	X	X	X	X
Rose-breasted Grosbeak	X	-	X	-	-
Indigo Bunting	X	X	-	-	-
Bobolink	-	X	-	-	-
Red-winged Blackbird	X	X	X	X	X
Common Grackle	X	X	X	-	X
Brown-headed Cowbird	X	X	-	-	-
Baltimore Oriole	X	X	X	X	X
House Finch	X	X	-	X	-
American Goldfinch	X	X	X	-	-
House Sparrow	X	X	-	X	X

The distribution of individuals and species in MIMA varied between stations, but no clear patterns were discernable. Figure 3-2 shows the mean number of individuals detected at each sampling station, while Figure 3-3 shows the total number of species detected at each sampling station. The relative abundance of each species at each sampling station can be found in Appendix 3-A.

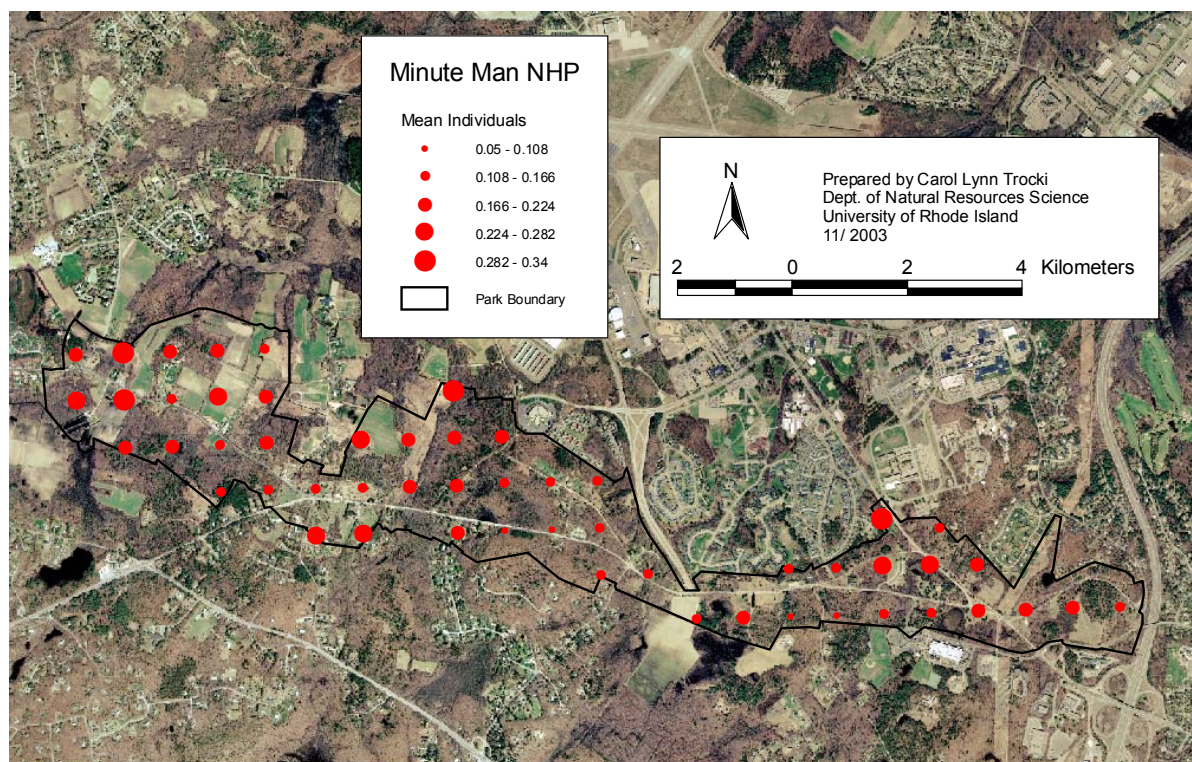


Figure 3-2. The mean number of individuals (all species combined) detected at each point count station in Minute Man NHS during VCP surveys in 2002 and 2003.

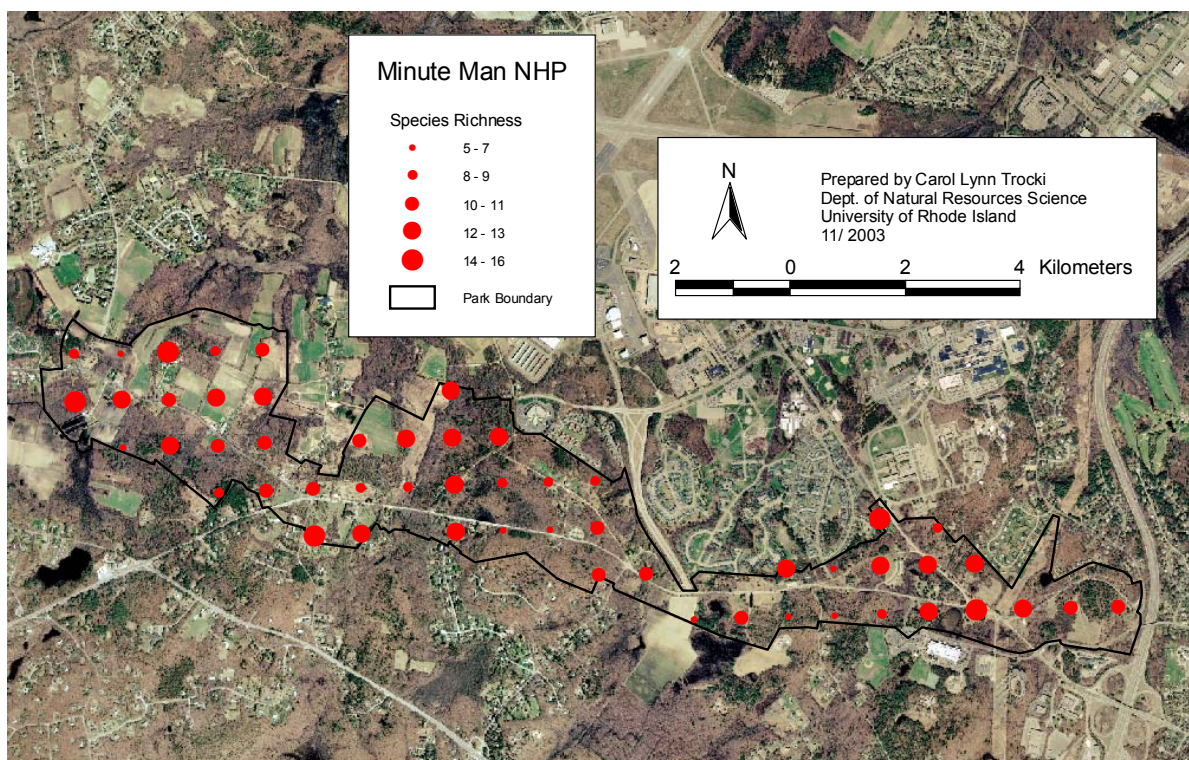


Figure 3-3. The total number of species detected at each point count station in Minute Man NHS during VCP surveys in 2002 and 2003.

Chapter 4

Avian surveys in Northeast Temperate Network Parks:

Saugus Ironworks National Historic Sites (SAIR)

Background

Saugus Iron Works National Historic Site (SAIR), a 8.51 acre park in Saugus, Massachusetts, was established by Public Law 90-282 on April 5, 1968, to preserve in perpetuity the archeological sites and features, the historic and reconstructed structures and scenes, and the museum collections associated with America's first sustained, integrated, and successful iron works venture (SAMA-SAIR Annual Performance Plan 2003).

The historic structures of the Iron Works are nestled along the banks of the Saugus River, an important natural resource for newly settled families and workers to the area during the 17th century. The tidally influenced Saugus River is also a principal natural resource for a wide variety of plants, animals, and other organisms that depend on the river, riparian woodlands, and surrounding marshes as an important habitat (<http://www.nps.gov/sair/pphtml/nature.html>). No known avian surveys have ever been conducted in SAIR (Daniel Noon, Natural Resources Manager, SAIR, personal communication).

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at SAIR in 2002 and 2003. Prior to the 2002 breeding season, three randomly-generated point count stations were established within the Park (Figure 4-1). These three stations were visited four times during the breeding season in 2002, and two times during the breeding season in 2003 (Table 4-1). One station was located in a developed area adjacent to park buildings, one was in forest habitat, and one was primarily in wetland habitat (Table 4-1). As evident in Figure 4-1, SAIR is located within a high-density residential setting.

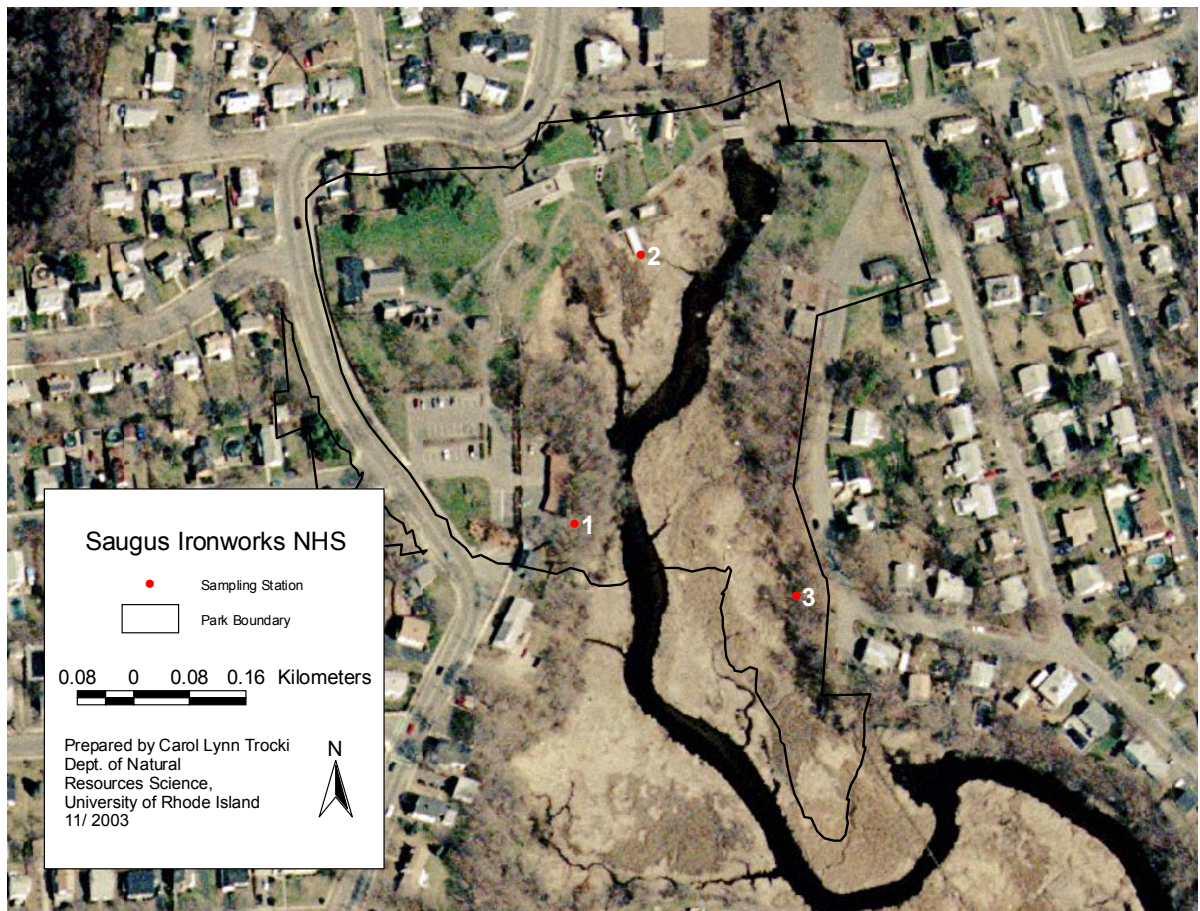


Figure 4-1. Locations of point count stations in Saugus Iron Works National Historic Site (SAIR) surveyed during the breeding season in 2002 and 2003.

Table 4-1. UTM coordinates of point count stations in Saugus Iron Works NHS, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat at each station.

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
1	334921	4703670	4	2	Developed
2	334953	4703786	4	2	Wetland
3	335016	4703636	4	2	Wetland / Forest

Survey Results

A total of 37 species were detected at SAIR (Table 4-2), of which 29 species (78%) were detected during VCP surveys. Breeding species were defined as those species with a relative abundance of ≥ 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g., visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, all of the 29 species detected during VCP surveys breed within the park, although this should be viewed with caution given the small number of point count surveys ($N = 18$). Of the additional 8 species detected outside of VCP surveys, four species could potentially breed within the park based on available habitat and current breeding ranges (National Geographic 1999). Given that waterbird colonies are visually obvious, it is unlikely that Great Blue Heron, Black-crowned Night-Heron, Great Black-backed Gull, or Herring Gull breed within the park, although they actively forage there.

Seventeen species observed during VCP surveys (59 %) were detected at $\geq 50\%$ (2 or more) of the sampling stations within the park (Table 4-2). Of these most frequently detected species, House Sparrow ($\bar{x} = 9.11$, $SE = 2.46$), European Starling ($\bar{x} = 3.89$, $SE = 1.19$), and Red-winged Blackbird ($\bar{x} = 2.89$, $SE = 0.06$) were the most abundant species.

Of the species breeding in the park, three (10%) are listed as priority species in the Partners In Flight (PIF) Landbird Conservation Plan for Physiographic Area 9, Southern New England (Dettmers and Rosenberg 2000)(Table 4-2). Baltimore Oriole is listed by PIF as a high continental conservation priority with a high level of responsibility falling on the Southern New England region. Baltimore Orioles are a neotropical migrant that breed in mature deciduous trees throughout the eastern United States (DeGraaf and Rappole 1995). Although common in Southern New England, Baltimore Orioles have been experiencing severe population declines (Sauer et al 2003).

Table 4-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Saugus Iron Works NHS during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=18)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Great Blue Heron	-	-	L	-
Black-crowned Night-Heron	-	-	L	-
Canada Goose	0.33 \pm 0.33	33	B	-
Mallard	0.06 \pm 0.06	33	B	-
Herring Gull	-	-	L	-
Great Black-backed Gull	-	-	L	-
Rock Dove	0.11 \pm 0.11	33	B	-
Mourning Dove	0.22 \pm 0.13	67	B	-
Chimney Swift	0.11 \pm 0.11	33	B	IIA
Belted Kingfisher	-	-	L	-
Red-bellied Woodpecker	-	-	L	-
Downy Woodpecker	0.06 \pm 0.06	33	B	-
Northern Flicker	0.06 \pm 0.06	33	B	-
Eastern Phoebe	0.33 \pm 0.16	33	B	-
Blue Jay	0.17 \pm 0.12	67	B	-
American Crow	1.67 \pm 0.45	100	B	-
Barn Swallow	-	-	L	-
Black-capped Chickadee	0.11 \pm 0.08	67	B	-
Tufted Titmouse	0.11 \pm 0.08	67	B	-
White-breasted Nuthatch	0.11 \pm 0.11	33	B	-
American Robin	1.17 \pm 0.33	100	B	-
Gray Catbird	1.17 \pm 0.33	100	B	-
Northern Mockingbird	0.22 \pm 0.10	67	B	-
European Starling	3.89 \pm 1.19	100	B	-
Yellow Warbler	0.33 \pm 0.11	100	B	-
Ovenbird	-	-	L	-
Common Yellowthroat	0.39 \pm 0.14	100	B	-
Song Sparrow	1.11 \pm 0.20	100	B	-
Northern Cardinal	0.72 \pm 0.14	100	B	-
Rose-breasted Grosbeak	0.06 \pm 0.06	33	B	IIA
Indigo Bunting	0.06 \pm 0.06	33	B	-
Red-winged Blackbird	2.89 \pm 0.06	100	B	-
Common Grackle	0.33 \pm 0.28	67	B	-
Baltimore Oriole	0.22 \pm 0.13	67	B	IA
House Finch	0.06 \pm 0.06	33	B	-
American Goldfinch	0.06 \pm 0.06	33	B	-

Table 4-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Saugus Iron Works NHS during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm SE$ (n=18)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
House Sparrow	9.11 \pm 2.46	100	B	-

^a**Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park;

L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown

^b**PIF Priority Species Designations:** IA - High Continental Priority, High Regional Responsibility; IB - High Continental Priority, Low Regional Responsibility; IIA - High Regional Concern;

Rose-breasted Grosbeak and Chimney Swift are both listed by PIF as a high continental conservation priority, but with low responsibility for conservation falling on the Southern New England region. Rose-breasted Grosbeaks are a neotropical migrant associated with deciduous forest or thick shrubs, while Chimney Swifts generally rely on human structures for nesting (DeGraaf and Rappole 1995). None of the species detected at SAIR are federally or state listed as endangered or threatened.

Of the 29 species detected during VCP surveys, all 29 were detected at stations located primarily in wetland and forested habitat, while only 14 species (48%) were detected at stations in developed habitat (Table 4-3).

Table 4-3. Habitat associations of species detected during VCP point count surveys.

Species	Developed Stations (N=1)	Wetland / Forest Stations (N=2)
Canada Goose	-	X
Mallard	-	X
Rock Dove	-	X
Mourning Dove	X	X
Downy Woodpecker	-	X
Northern Flicker	-	X
Eastern Phoebe	-	X
Blue Jay	X	X
American Crow	X	X
Black-capped Chickadee	-	X
Tufted Titmouse	-	X
White-breasted Nuthatch	-	X
American Robin	X	X
Gray Catbird	X	X
Northern Mockingbird	X	X
European Starling	X	X
Yellow Warbler	X	X
Chestnut-sided Warbler	-	X
Common Yellowthroat	X	X
Song Sparrow	X	X
Northern Cardinal	X	X
Rose-breasted Grosbeak	-	X
Indigo Bunting	-	X
Red-winged Blackbird	X	X
Common Grackle	X	X
Baltimore Oriole	-	X
House Finch	-	X
American Goldfinch	-	X
House Sparrow	X	X

The distribution of individuals and species in SAIR varied markedly between stations. Stations 1 and 3 had slightly higher abundance (Figure 4-2). As would be expected, station 1, located primarily in developed habitat, had drastically fewer species observed (Table 4-3). The relative abundance of each species at each sampling station can be found in Appendix 4-A.

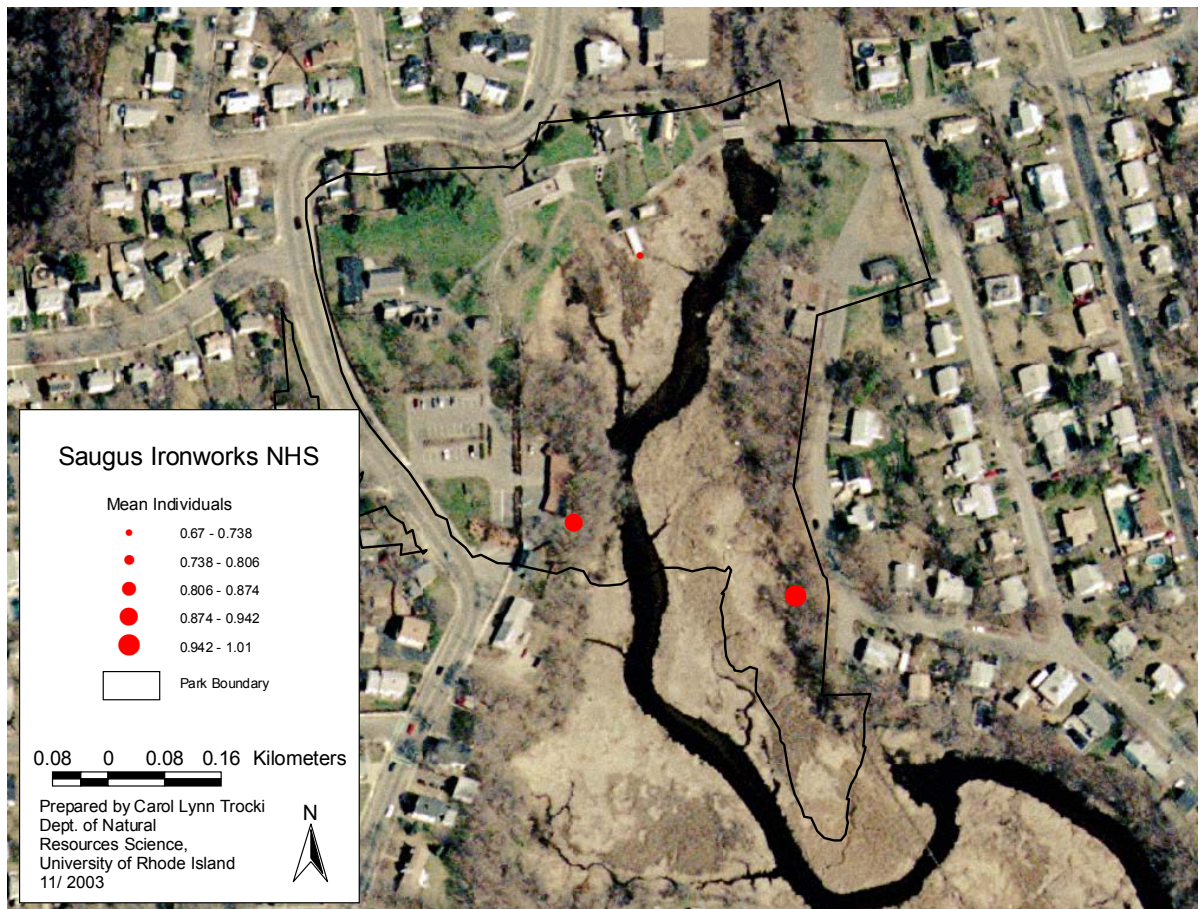


Figure 4-2. The mean number of individuals (all species combined) detected at each point count station in Saugus Iron Works NHS during VCP surveys in 2002 and 2003.

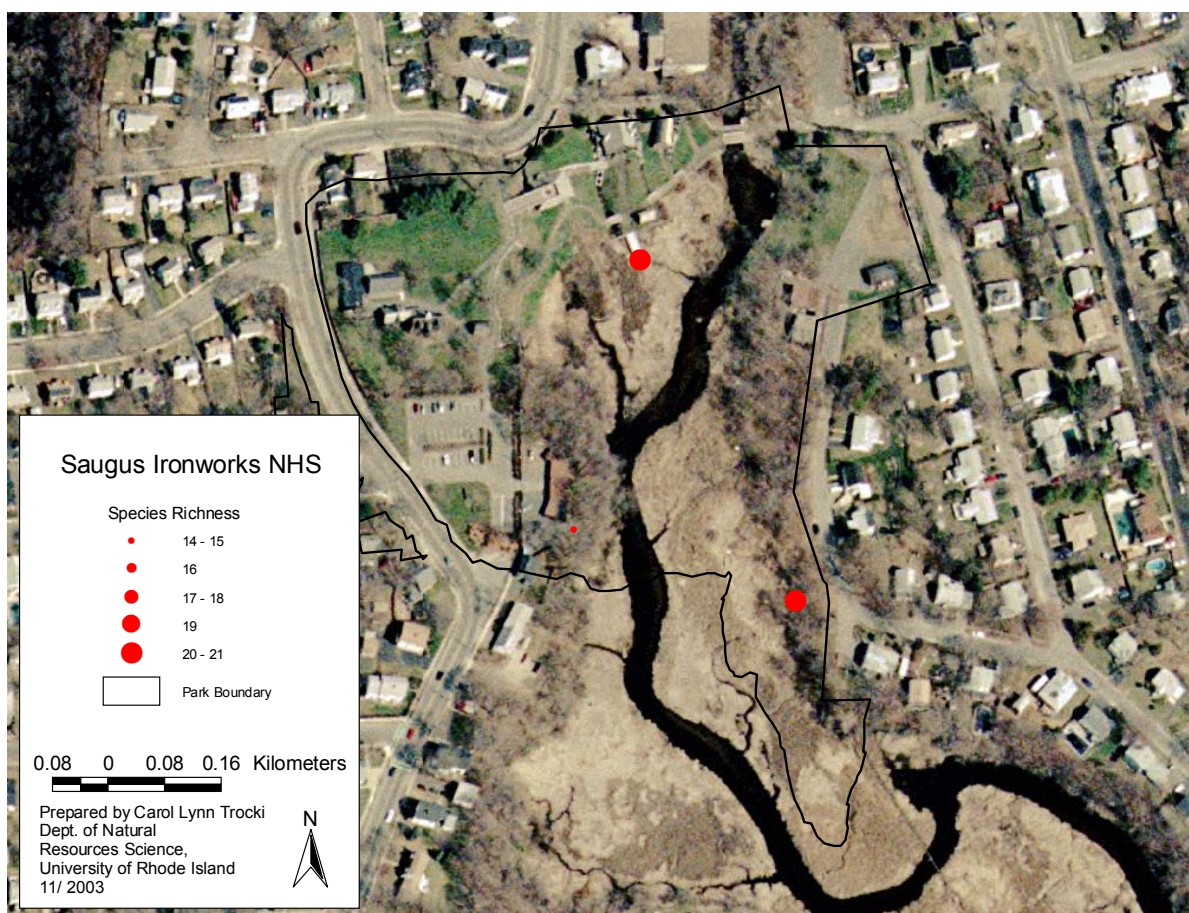


Figure 4-3. The total number of species detected at each sampling station in Saugus Iron Works NHS during VCP surveys in 2002 and 2003.

Chapter 5

Avian surveys in Northeast Temperate Network Parks:

Weir Farm National Historic Site (WEFA)

Background

Weir Farm, the historic home of American Impressionist painter J. Alden Weir (1852-1919), was designated a National Historic Site by the U.S. Congress in 1990. The threefold purpose of Weir Farm National Historic Site (WEFA), as described in its enabling legislation, is to 1) preserve a significant site associated with the tradition of American Impressionism; 2) maintain the integrity of a setting that inspired artistic expression; and 3) continue to offer opportunities for people to study and create art at the farm (Weir Farm General Management Plan / Environmental Impact Statement 1995).

Weir Farm National Historic Site is located in the Southwest Hills Ecoregion in the southern part of Connecticut. The park, located in the towns of Ridgefield and Wilton, includes successional old fields, mesic successional hardwood forests, vernal wetland areas, streams, Weir pond, rocky ridges and two farmsteads with their associated outbuildings. Two new parcels of land, located one half a mile away and totaling 11 acres, have recently been added to the park (National Park Service 2003). The only known inventory of avian species at WEFA was compiled by Peterson et al. in 1976, and lists a total of 29 probable breeding species.

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at WEFA in 2002 and 2003. Prior to the 2002 breeding season, six randomly generated point count sampling stations were established within the site (Figure 5-1). All six stations were visited 5 times during the breeding season in 2002, and 5 times during the breeding season in 2003 (Table 5-1). Four of the six stations were located entirely within forested habitat, while two stations were primarily grassland.

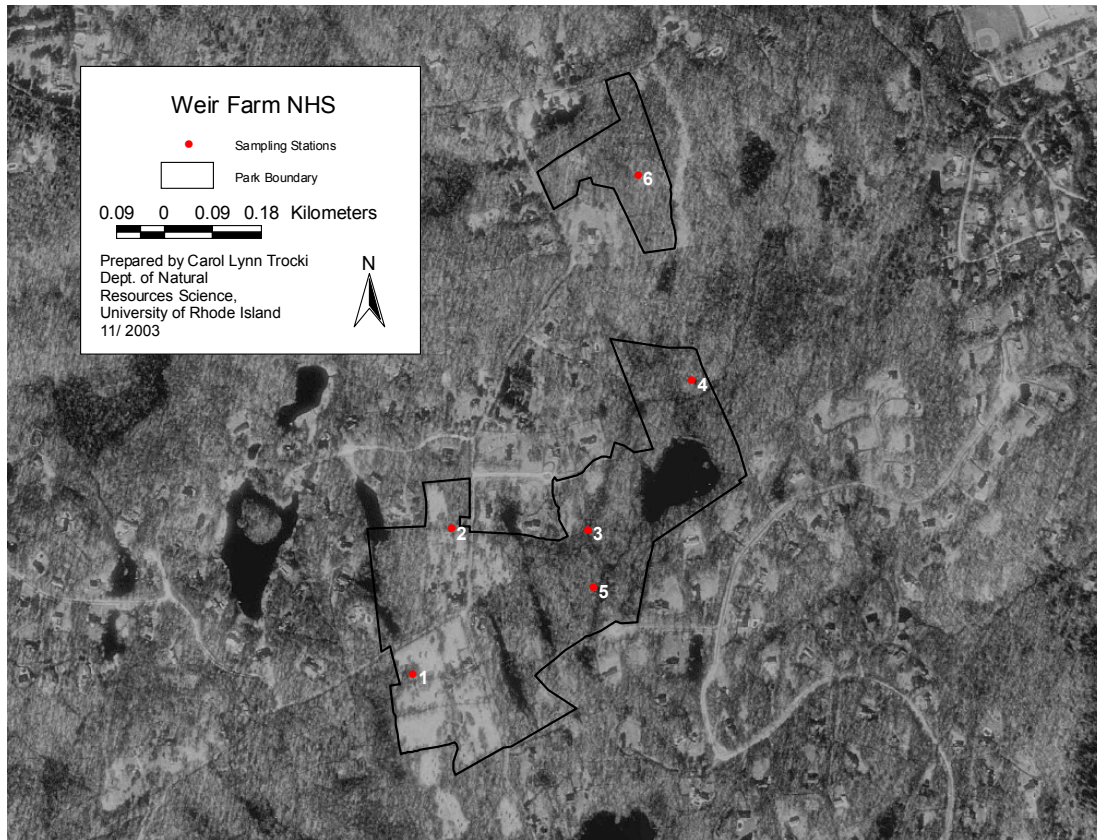


Figure 5-1. Locations of point count stations in Weir Farm National Historic Site (WEFA) surveyed during the breeding season in 2002 and 2003.

Table 5-1. UTM coordinates of point count stations in Weir Farm NHS, number of visits to each station during the breeding season in 2002 and 2003, and the general habitat type at each station.

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
1	629212	4568358	5	5	Grassland
2	629284	4568629	5	5	Grassland
3	629537	4568626	5	5	Forest
4	629731	4568905	5	5	Forest
5	629548	4568520	5	5	Forest
6	629630	4569287	5	5	Forest

Survey Results

A total of 65 species were detected at WEFA (Table 5-2), of which 57 species (88%) were detected during VCP surveys. Breeding species were defined as those species with a relative abundance of ≥ 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g., visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, 38 of the species detected (59%) breed within the park. An additional 25 species (39%) had a relative abundance of < 0.05 individuals per sampling station, but could breed within the park based on current breeding ranges and habitat associations (National Geographic 1999). Three migrant species, Magnolia Warbler, Black-throated Blue Warbler, and Wilson's Warbler (National Geographic 1999), were detected, each on only a single occasion.

Twenty-five species detected during VCP surveys (44 %) were detected at $\geq 50\%$ (3 or more) of the sampling stations within the park (Table 5-2). Of these most frequently detected species, Tufted Titmice ($\bar{x} = 2.08$, SE = 0.25), Black-capped Chickadees ($\bar{x} = 0.98$, SE = 0.25), and Ovenbirds ($\bar{x} = 0.92$, SE = 0.14) were the most abundant.

Of the species breeding in the park, seven (11%) are listed as priority species in the Partners In Flight (PIF) Landbird Conservation Plan for Physiographic Area 9, Southern New England (Dettmers and Rosenberg 2000)(Table 5-2). Wood Thrush, Louisiana Waterthrush, and Scarlet Tanager are all species listed by PIF as a high continental conservation priority with a high level of responsibility falling on the Southern New England region. All three of these species are neotropical migrants associated with mature deciduous and mixed forests (DeGraaf and Rappole 1995). Of other PIF priority breeding species, Hairy Woodpecker, Eastern Wood-Pewee, and Black-and-White Warbler are also considered a high continental conservation priority, but with low responsibility for conservation falling on the Southern New England region. These species are also all associated with mature deciduous and mixed forest (Dettmers and Rosenberg 2000). One breeding species, Barn Owl, is listed as endangered by the State of Connecticut (Connecticut Department of Environmental Protection 1998). Other species of continental conservation priority present, but not known to be breeding in the park, include Baltimore Oriole, Chimney Swift, and Black-throated Blue Warbler.

Table 5-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Weir Farm NHS during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=60)	Occurrence (% of species)	Park Status ^a	PIF Priority Species ^b
Canada Goose	0.05 ± 0.05	17	B	-
Wood Duck	-	-	L	-
Sharp-shinned Hawk	-	-	L	CT - E
Red-shouldered Hawk	0.03 ± 0.02	33	L	CT – SC
Broad-winged Hawk	0.02 ± 0.02	17	L	-
Red-tailed Hawk	0.05 ± 0.03	17	B	-
Wild Turkey	0.05 ± 0.03	50	B	-
Mourning Dove	0.10 ± 0.05	50	B	-
Yellow-billed Cuckoo	-	-	L	-
Barn Owl	0.02 ± 0.02	17	B	CT - E
Chimney Swift	-	-	L	IIA.
Ruby-throated Hummingbird	-	-	L	-
Belted Kingfisher	0.02 ± 0.02	17	L	-
Red-bellied Woodpecker	0.48 ± 0.09	83	B	-
Downy Woodpecker	0.40 ± 0.01	100	B	-
Hairy Woodpecker	0.13 ± 0.04	67	B	IIA.
Northern Flicker	0.02 ± 0.02	17	L	-
Pileated Woodpecker	0.05 ± 0.03	50	B	-
Eastern Wood-Pewee	0.20 ± 0.06	83	B	IIA.
Least Flycatcher	0.08 ± 0.04	33	B	-
Eastern Phoebe	0.08 ± 0.04	33	B	-
Great Crested Flycatcher	0.28 ± 0.07	83	B	-
Eastern Kingbird	0.02 ± 0.02	17	L	-
White-eyed Vireo	0.03 ± 0.03	17	L	-
Yellow-throated Vireo	0.02 ± 0.02	17	L	-
Blue-headed Vireo	0.02 ± 0.02	17	L	-
Red-eyed Vireo	0.53 ± 0.10	100	B	-
Blue Jay	0.73 ± 0.13	100	B	-
American Crow	0.82 ± 0.18	100	B	-
Black-capped Chickadee	0.98 ± 0.25	100	B	-
Tufted Titmouse	2.08 ± 0.25	100	B	-
White-breasted Nuthatch	0.57 ± 0.10	100	B	-
Brown Creeper	0.07 ± 0.03	33	B	-
Carolina Wren	0.02 ± 0.02	17	L	-
House Wren	0.12 ± 0.06	50	B	-
Eastern Bluebird	0.33 ± 0.08	50	B	-

Table 5-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Weir Farm NHS during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Southern New England Physiographic Area (Dettmers and Rosenberg 2000). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued)

Species	$\bar{x} \pm SE$ (n=60)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Veery	-	-	L	-
Wood Thrush	0.17 ± 0.06	83	B	IA.
American Robin	0.35 ± 0.10	100	B	-
Gray Catbird	0.08 ± 0.04	33	B	-
Northern Mockingbird	0.08 ± 0.05	17	B	-
European Starling	0.08 ± 0.06	33	B	-
Cedar Waxwing	0.17 ± 0.10	33	B	-
Magnolia Warbler	0.03 ± 0.03	17	M	-
Black-throated Blue Warbler	0.02 ± 0.02	17	M	IB.
Pine Warbler	0.03 ± 0.03	17	L	-
Black-and-White Warbler	0.08 ± 0.04	83	B	IIA.
Ovenbird	0.92 ± 0.14	83	B	-
Northern Waterthrush	0.02 ± 0.02	17	L	-
Louisiana Waterthrush	0.10 ± 0.04	50	B	IA.
Wilson's Warbler	0.02 ± 0.02	17	M	-
Scarlet Tanager	0.18 ± 0.06	50	B	IA.
Eastern Towhee	0.02 ± 0.02	17	L	-
Chipping Sparrow	0.72 ± 0.22	33	B	-
Field Sparrow	0.02 ± 0.02	17	L	-
Savannah Sparrow	-	-	L	CT- SC
Song Sparrow	0.27 ± 0.10	67	B	-
Northern Cardinal	0.72 ± 0.13	100	B	-
Red-winged Blackbird	-	-	L	-
Common Grackle	0.03 ± 0.02	33	L	-
Brown-headed Cowbird	0.02 ± 0.02	17	L	-
Baltimore Oriole	0.02 ± 0.02	17	L	IA
House Finch	0.37 ± 0.22	33	B	-
American Goldfinch	0.47 ± 0.13	83	B	-
House Sparrow	0.37 ± 0.20	33	B	-

^a **Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park; L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown; M - migrant

^b **PIF Priority Species Designations:** IA - High Continental Priority, High Regional Responsibility; IB - High Continental Priority, Low Regional Responsibility; IIA - High Regional Concern; CT- State Listed in Connecticut, E: endangered, SC: species of concern

Four species of hawks were observed using habitats in the park. Of these, Sharp-shinned Hawk is listed as an endangered species in the State of Connecticut, while Red-shouldered Hawk is listed as a species of conservation concern (Connecticut Department of Environmental Protection 1998). Additionally, a single Savannah Sparrow was flushed while moving between grassland stations in 2002. Savannah Sparrows are also listed as a species of conservation concern in the State of Connecticut.

Of the 57 species detected during VCP surveys, 45 species (80%) were detected at stations located primarily in forested habitat, while 39 species (68%) were detected at stations primarily located within grassland habitat (Table 5-3). Given the close proximity of grassland and forested habitats at WEFA it is not surprising that many species were detected at stations located within both habitat types.

Table 5-3. Habitat associations of species detected during VCP point count surveys at WEFA.

Species	Grassland Stations (n=2)	Forest Stations (n=4)	Species	Grassland Stations (n=2)	Forest Stations (n=4)
Canada Goose	X	-	Wood Thrush	X	X
Red-shouldered Hawk	-	X	American Robin	X	X
Broad-winged Hawk	-	X	Gray Catbird	X	X
Red-tailed Hawk	-	X	Northern Mockingbird	X	-
Wild Turkey	X	X	European Starling	X	-
Mourning Dove	X	X	Cedar Waxwing	X	X
Barn Owl	-	X	Magnolia Warbler	X	-
Belted Kingfisher	-	X	Black-throated Blue Warbler	-	X
Red-bellied Woodpecker	X	X	Pine Warbler	X	-
Downy Woodpecker	X	X	Black-and-White Warbler	X	X
Hairy Woodpecker	X	X	Ovenbird	X	X
Northern Flicker	X	-	Northern Waterthrush	-	X
Pileated Woodpecker	-	X	Louisiana Waterthrush	-	X
Eastern Wood-Pewee	X	X	Wilson's Warbler	-	X
Least Flycatcher	-	X	Scarlet Tanager	X	X
Eastern Phoebe	X	X	Eastern Towhee	X	-
Great Crested Flycatcher	X	X	Chipping Sparrow	X	-
Eastern Kingbird	-	X	Field Sparrow	X	-
White-eyed Vireo	-	X	Song Sparrow	X	X
Yellow-throated Vireo	X	-	Northern Cardinal	X	X
Blue-headed Vireo	-	X	Common Grackle	X	X
Red-eyed Vireo	X	X	Brown-headed Cowbird	-	X
Blue Jay	X	X	Baltimore Oriole	-	X
American Crow	X	X	House Finch	X	-
Black-capped Chickadee	X	X	American Goldfinch	X	X
Tufted Titmouse	X	X	House Sparrow	X	-
White-breasted Nuthatch	X	X			
Brown Creeper	-	X			
Carolina Wren	-	X			
House Wren	X	X			
Eastern Bluebird	X	X			

In general, the two sampling stations located within grassland habitat tended to have a higher relative abundance of individuals detected than those stations located in forested habitats (Figure 5-2). The total number of species detected at grassland stations was also higher on a station-by-station basis, but species richness ranged very little between sites (Figure 5-3). The relative abundance of each species at each sampling station can be found in Appendix 5-A.

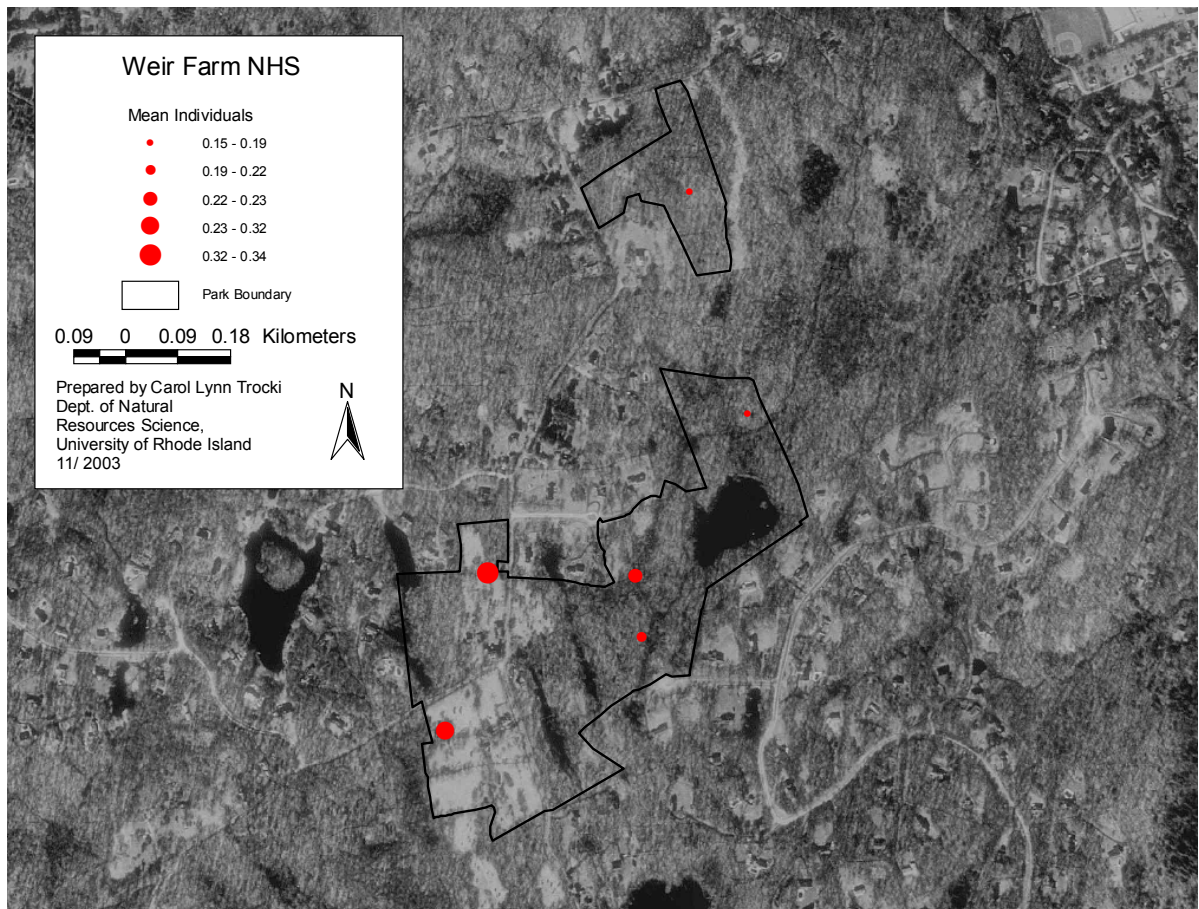


Figure 5-2. The mean number of individuals (all species combined) detected at each point count station in Weir Farm NHS during VCP surveys in 2002 and 2003.

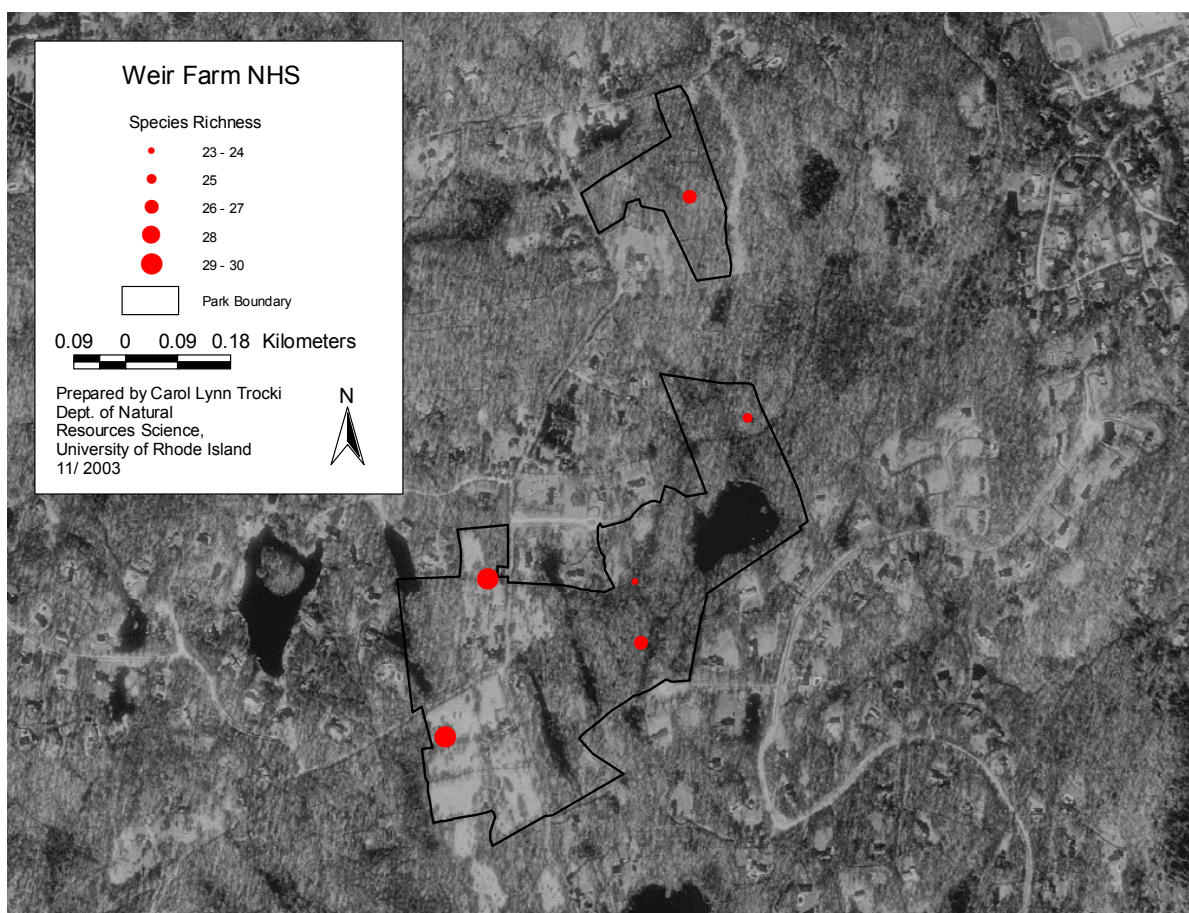


Figure 5-3. The total number of species detected at each sampling station in Weir Farm NHS during VCP surveys in 2002 and 2003.

Chapter 6

Avian surveys in Northeast Temperate Network Parks:

Roosevelt-Vanderbilt National Historic Sites (ROVA)

Background

Collectively managed under the umbrella title of Roosevelt-Vanderbilt National Historic Sites, ROVA consists of three separate units of the National Park Service: the Home of Franklin D. Roosevelt National Historic Site (HOFR), the Vanderbilt Mansion National Historic Site (VAMA), and the Eleanor Roosevelt National Historic Site (ELRO). All three sites are located in Hyde Park, New York.

Both Vanderbilt Mansion NHS (in 1940) and Home of Franklin D Roosevelt NHS (in 1944) were created by Presidential Proclamation. An Act of Congress established Eleanor Roosevelt NHS in 1977. The three sites contain a combined 683 acres and were established to preserve the historic residences and landscapes of three prominent figures of the Twentieth Century (Strategic Plan for Roosevelt-Vanderbilt NHS 2001).

Both the Home of Franklin D. Roosevelt and Vanderbilt Mansion National Historic Sites border on the Hudson River, which is a large freshwater estuary until it reaches a dam located at Troy, New York, 75 miles to the north. The Roosevelt site (HOFR) contains many plantations that were part of FDR's forestry work, while the Vanderbilt site (VAMA) contains one of the finest collections of native and exotic specimen trees in North America. The damming of Fall-Kill Creek by the Roosevelt family in 1925 created an extensive wetlands complex at Eleanor Roosevelt NHS (ELRO), creating important habitat for many wildlife species. A series of permanent and seasonal woodland ponds also occur in ELRO, as well as mature second-growth hardwood forest, numerous rock outcrops, a sphagnum swamp, and a wet sedge meadow (http://www.nps.gov/hofr/nr_intro.html).

National Park Service records of bird sightings in ROVA list a total of 133 species detected in the park during all seasons, but few quantitative surveys have been conducted (David Hayes, Natural Resource Specialist, ROVA, personal communication).

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at ROVA in 2002 and 2003. Prior to the 2002 breeding season, 41 randomly-generated point count sampling stations were established within the park (Figure 6-1). Each station was visited once during the breeding season in 2002 and once during the breeding season in 2003 (Table 6-1).

Thirteen sampling stations (32%) at ROVA were located in areas with primarily managed landscapes (mainly lawns and landscape plantings). Eleven stations (27%) were located in deciduous forest, six stations (15%) in open grassland habitat, five stations (12%) in mixed forest, three stations (7%) in forested wetlands, two stations (5%) in freshwater wetlands, and a single station (2%) in conifer forest (Table 6-1).

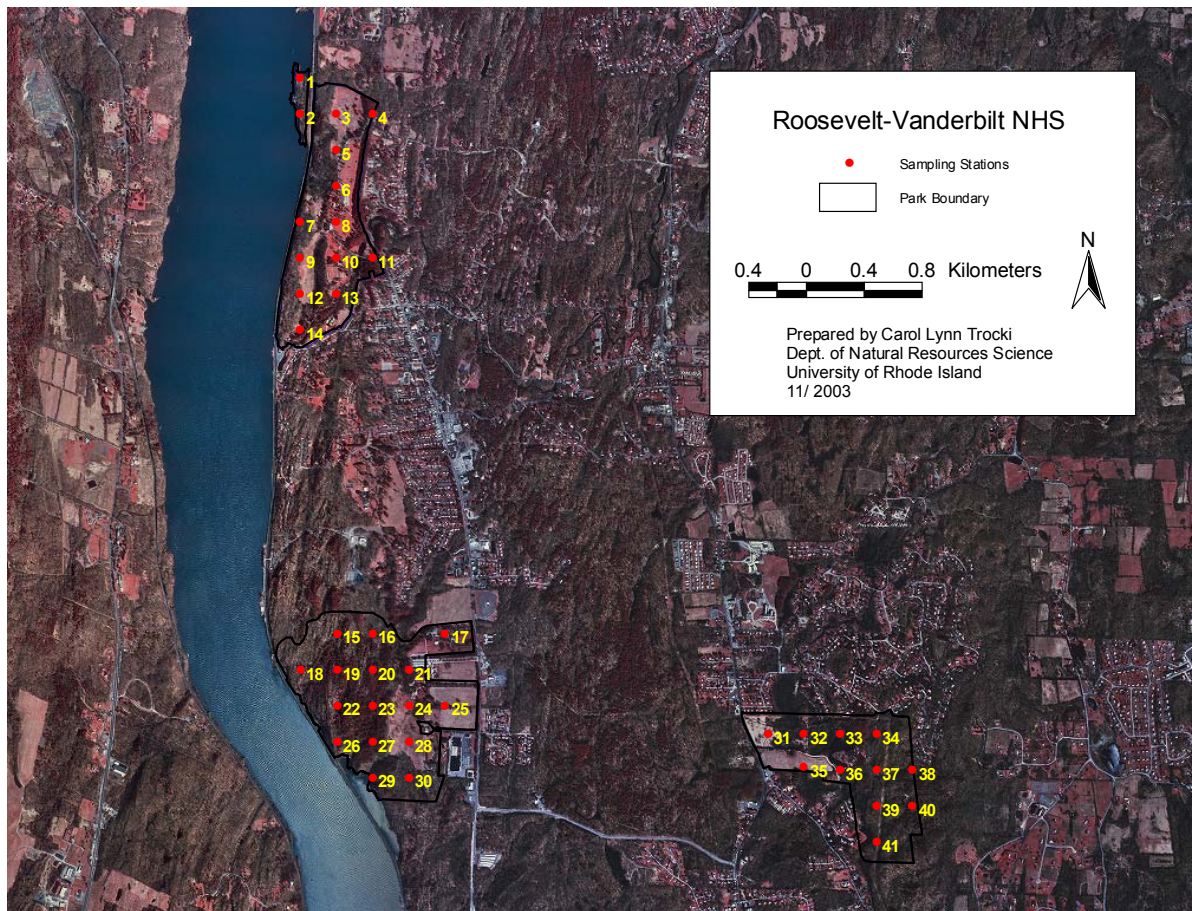


Figure 6-1. Location of point count stations in Roosevelt-Vanderbilt National Historic Sites (ROVA) surveyed during the breeding season in 2002 and 2003.

Table 6-1. UTM coordinates of point count stations Roosevelt-Vanderbilt NHS, specific park unit of each station, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station.

Station Number	Park Unit	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
1	VAMA	587696	4628737	1	1	Managed Landscape
2	VAMA	587696	4628487	1	1	Deciduous Forest
3	VAMA	587946	4628487	1	1	Grassland
4	VAMA	588196	4628487	1	1	Managed Landscape
5	VAMA	587946	4628237	1	1	Grassland
6	VAMA	587946	4627987	1	1	Managed Landscape
7	VAMA	587696	4627737	1	1	Deciduous Forest
8	VAMA	587946	4627737	1	1	Managed Landscape
9	VAMA	587696	4627487	1	1	Deciduous Forest
10	VAMA	587946	4627487	1	1	Managed Landscape
11	VAMA	588196	4627487	1	1	Managed Landscape
12	VAMA	587696	4627237	1	1	Grassland
13	VAMA	587946	4627237	1	1	Managed Landscape
14	VAMA	587696	4626987	1	1	Managed Landscape
15	HOFR	587950	4624884	1	1	Deciduous Forest
16	HOFR	588200	4624884	1	1	Deciduous Forest
17	HOFR	588700	4624884	1	1	Managed Landscape
18	HOFR	587700	4624634	1	1	Deciduous Forest
19	HOFR	587950	4624634	1	1	Mixed Forest
20	HOFR	588200	4624634	1	1	Mixed Forest
21	HOFR	588450	4624634	1	1	Managed Landscape
22	HOFR	587950	4624384	1	1	Forested Wetland
23	HOFR	588200	4624384	1	1	Deciduous Forest
24	HOFR	588450	4624384	1	1	Grassland
25	HOFR	588700	4624384	1	1	Grassland
26	HOFR	587950	4624134	1	1	Mixed Forest
27	HOFR	588200	4624134	1	1	Conifer Forest
28	HOFR	588450	4624134	1	1	Grassland
29	HOFR	588200	4623884	1	1	Mixed Forest
30	HOFR	588450	4623884	1	1	Deciduous Forest
31	ELRO	590938	4624188	1	1	Wetland
32	ELRO	591188	4624188	1	1	Managed Landscape
33	ELRO	591438	4624188	1	1	Wetland
34	ELRO	591688	4624188	1	1	Deciduous Forest
35	ELRO	591188	4623965	1	1	Forested Wetland, Grassland
36	ELRO	591438	4623938	1	1	Managed Landscape, Wetland
37	ELRO	591688	4623938	1	1	Deciduous Forest, Wetland
38	ELRO	591938	4623938	1	1	Forested Wetland
39	ELRO	591688	4623688	1	1	Deciduous Forest
40	ELRO	591938	4623688	1	1	Mixed Forest
41	ELRO	591688	4623438	1	1	Managed Landscape

From February to May 2003, waterbird surveys were conducted at 12 fixed-point stations along the Hudson River (Table 6-2). Stations were visited between two and seven times each, depending on ice cover and access given severe weather conditions.

Table 6-2. UTM coordinates of waterbird stations at Roosevelt-Vanderbilt NHS, specific park unit of each station, number of visits to each station during spring 2003, and the dominant habitat type at each station.

Park Unit	Station Letter	UTM X	UTM Y	Location Description
VAMA	A	587536	4628967	River
VAMA	B	587836	4627732	River Mouth
VAMA	C	587950	4628268	River
VAMA	D	588046	4627377	Stream, Managed Landscape
VAMA	E	587196	4627762	Cove
VAMA	F1	587056	4628687	River
VAMA	F2	587652	4628570	River, Cove
HOFR	M	587942	4624050	River
HOFR	N	587500	4624734	River
ELRO	G	591465	4623968	Pond
ELRO	H	591370	4623993	Marsh, Stream
ELRO	K	591623	4623653	Forested Wetland

Survey Results

A total of 81 species were detected in ROVA during 2002 and 2003, including species detected during VCP point count surveys and waterbird surveys in the park (Table 6-3). Of these, 62 (77%) were detected during VCP point count surveys conducted during the breeding season.

Breeding species were defined as those species with a relative abundance of ≥ 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g., visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, 42 species (68%) detected during VCP surveys breed within the park. Eight of these breeding species (19%) were detected at $\geq 50\%$ of the sampling stations within the park (Table 6-3). Tufted Titmice ($\bar{x} = 0.73$, SE = 0.08), Red-eyed Vireos ($\bar{x} = 0.70$, SE = 0.08), and American Crows ($\bar{x} = 0.59$, SE = 0.13) were the most abundant species (Table 6-3).

Of species breeding in the park, six are listed by Partners In Flight as conservation priorities for the Northern Ridge and Valley Physiographic Area (Area 17; http://www.blm.gov/wildlife/pl_17sum.htm). Both Wood Thrush and Worm-Eating Warbler are listed as high continental priorities for conservation efforts, while Eastern Wood-Pewee, Scarlet Tanager, and Baltimore Oriole are listed as species of high regional priority. All five of these species are neotropical migrants associated with deciduous and mixed forest communities (DeGraaf and Rappole 1995). Wood Thrushes commonly occur in forested wetlands, while Worm-eating Warblers are generally associated with dense underbrush and steep ravines (DeGraaf and Rappole 1995). PIF also lists Gray Catbird as a U.S. National Watch List species.

Although not detected with a high enough frequency to meet the breeding species criteria used in this survey, Eastern Towhees were detected on a single occasion at VAMA, and may breed within the park based on their current breeding range and habitat requirements (National Geographic 1999). Eastern Towhees are listed by PIF as a regional priority for conservation.

Table 6-3. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Roosevelt-Vanderbilt NHS during point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during waterbird surveys, other field surveys, or between point count stations, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=82)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Double-crested Cormorant	-	-	L	-
Great Blue Heron	-	-	L	-
Great Egret	-	-	L	-
Green Heron	0.01 \pm 0.01	2	L	-
Black-crowned Night-Heron	0.01 \pm 0.01	2	L	-
Canada Goose	0.01 \pm 0.01	2	L	-
Mute Swan	-	-	L	III
Wood Duck	-	-	L	IIB
American Black Duck	-	-	L	I
Mallard	0.04 \pm 0.03	5	L	-
Canvasback	-	-	R	IIC
Ring-necked Duck	-	-	R	-
Hooded Merganser	-	-	R	-
Common Merganser	-	-	R	-
Osprey	-	-	L	NY-SC
Bald Eagle	-	-	L	F-T
Broad-winged Hawk	-	-	L	-
Red-tailed Hawk	0.01 \pm 0.01	2	L	-
Wild Turkey	0.04 \pm 0.04	2	L	-
Virginia Rail	-	-	L	-
Spotted Sandpiper	-	-	L	-
Ring-billed Gull	0.01 \pm 0.01	2	L	-
Great Black-backed Gull	-	-	L	-
Rock Dove	-	-	L	-
Mourning Dove	0.26 \pm 0.05	37	B	-
Yellow-billed Cuckoo	0.01 \pm 0.01	2	L	-
Chimney Swift	0.02 \pm 0.02	2	L	-
Red-bellied Woodpecker	0.46 \pm 0.06	66	B	-
Downy Woodpecker	0.05 \pm 0.02	10	B	-
Hairy Woodpecker	0.13 \pm 0.04	24	B	-
Northern Flicker	0.12 \pm 0.04	22	B	-
Pileated Woodpecker	0.06 \pm 0.03	12	B	-
Eastern Wood-Pewee	0.35 \pm 0.05	54	B	IIA
Willow Flycatcher	0.01 \pm 0.01	2	L	-
Eastern Phoebe	0.06 \pm 0.03	12	B	-

Table 6-3. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Roosevelt-Vanderbilt NHS during point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during waterbird surveys, other field surveys, or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm SE$ (n=82)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Great Crested Flycatcher	0.49 ± 0.07	66	B	-
Eastern Kingbird	0.05 ± 0.02	10	B	-
Yellow-throated Vireo	0.01 ± 0.01	2	L	-
Warbling Vireo	0.06 ± 0.03	10	B	-
Red-eyed Vireo	0.70 ± 0.08	80	B	-
Blue Jay	0.29 ± 0.07	37	B	-
American Crow	0.59 ± 0.13	51	B	-
Tree Swallow	0.01 ± 0.01	2	L	-
Barn Swallow	0.02 ± 0.02	2	L	-
Black-capped Chickadee	0.39 ± 0.08	61	B	-
Tufted Titmouse	0.73 ± 0.08	88	B	-
White-breasted Nuthatch	0.11 ± 0.04	17	B	-
Carolina Wren	0.04 ± 0.02	7	L	-
House Wren	0.06 ± 0.03	7	B	-
Blue-gray Gnatcatcher	0.01 ± 0.01	2	L	-
Eastern Bluebird	0.01 ± 0.01	2	L	-
Veery	0.10 ± 0.03	17	B	-
Wood Thrush	0.35 ± 0.08	46	B	I
American Robin	0.30 ± 0.08	34	B	-
Gray Catbird	0.33 ± 0.08	29	B	III
Northern Mockingbird	0.04 ± 0.02	7	L	-
European Starling	0.17 ± 0.07	15	B	-
Cedar Waxwing	0.45 ± 0.37	10	B	-
Northern Parula	-	-	M	-
Yellow Warbler	0.05 ± 0.02	5	B	-
Black-throated Green Warbler	-	-	M	-
Black-and-White Warbler	0.02 ± 0.02	5	L	-
American Redstart	0.06 ± 0.03	12	B	-
Worm-eating Warbler	0.16 ± 0.04	22	B	I
Ovenbird	0.06 ± 0.03	10	B	-
Louisiana Waterthrush	0.10 ± 0.04	17	B	-
Common Yellowthroat	0.12 ± 0.05	15	B	-
Scarlet Tanager	0.29 ± 0.06	44	B	IIB
Eastern Towhee	0.01 ± 0.01	2	L	IIA
Chipping Sparrow	0.34 ± 0.08	32	B	-

Table 6-3. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Roosevelt-Vanderbilt NHS during point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during waterbird surveys, other field surveys, or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm SE$ (n=82)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Song Sparrow	0.13 \pm 0.05	15	B	-
Northern Cardinal	0.66 \pm 0.09	71	B	-
Rose-breasted Grosbeak	0.07 \pm 0.03	15	B	-
Indigo Bunting	0.15 \pm 0.04	22	B	-
Red-winged Blackbird	0.29 \pm 0.09	22	B	-
Common Grackle	0.35 \pm 0.25	15	B	-
Brown-headed Cowbird	0.16 \pm 0.06	22	B	-
Baltimore Oriole	0.27 \pm 0.05	34	B	IIA
House Finch	0.04 \pm 0.03	5	L	-
American Goldfinch	0.51 \pm 0.11	54	B	-
House Sparrow	0.05 \pm 0.03	5	B	-

^a **Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park;

L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown, R – local resident outside of the breeding season, M - migrant

^b **PIF Priority Species Designations:** I - High Continental Priority; IIA - High Regional Concern; IIB – High Regional Responsibility; IIC – High Regional Threats; III – U.S. National Watch List; F – Federally Listed; NY – Listed in the State of New York; E- Endangered, T- Threatened, SC – Species of Concern

Seventeen species (21% of the total for the park) were detected during spring waterbird surveys along the Hudson River, 13 of which were not detected during breeding season point counts (Table 6-4). Among waterbird species detected at ROVA, American Black Duck is listed by PIF as a continental conservation priority, while Canvasback and Wood Duck are both listed as regional priorities for conservation efforts. In addition, Mute Swan appears on the U.S. National Watch List.

Other species of conservation interest detected at ROVA include both Osprey and Bald Eagle, both sighted on a single occasion during spring waterbird surveys. Ospreys are listed as a species of Special Concern in the State of New York (<http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/>). Bald Eagles are federally listed as a threatened species (<http://endangered.fws.gov/>).

Table 6-4. Relative abundance (mean \pm SE per point count station) of birds detected at fixed-point waterbird survey stations in Roosevelt-Vanderbilt NHS. Surveys were conducted February to May 2003.

Species	Station A VAMA (N=5)	Station B VAMA (N=5)	Station C VAMA (N=4)	Station D VAMA (N=3)	Station E VAMA (N=2)	Station F1 VAMA (N=3)	Station F2 VAMA (N=4)	Station G ELRO (N=7)	Station H ELRO (N=2)	Station K ELRO (N=6)	Station M HOFR (N=5)
Double-crested Cormorant	0.00	0.00	0.00	0.00	0.00	1.00, 0.58	1.25, 0.48	0.00	0.00	0.00	0.00
Great Blue Heron	0.00	0.00	0.25, 0.25	0.00	0.00	0.00	0.00	0.43, 0.43	0.00	0.00	1.20, 0.49
Great Egret	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20, 0.20
Canada Goose	2.00, 1.10	0.40, 0.40	6.25, 2.98	0.67, 0.67	0.00	7.00, 1.53	0.50, 0.50	5.57, 1.63	8.50, 3.50	0.50, 0.34	1.40, 0.24
Mute Swan	0.00	0.00	0.25, 0.25	0.00	0.00	0.00	0.00	0.29, 0.18	1.00, 1.00	0.00	0.00
Wood Duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14, 0.14	0.00	0.17, 0.17	0.00
American Black Duck	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40, 0.40
Mallard	0.00	0.00	0.25, 0.25	1.00, 0.58	2.50, 1.50	0.33, 0.33	0.00	1.29, 0.81	0.00	1.50, 0.22	1.80, 0.66
Canvasback	0.00	22.80, 22.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ring-necked Duck	5.20, 5.20	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	2.14, 2.14	0.00	0.00	0.20, 0.20
Hooded Merganser	0.80, 0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.14, 0.14	0.00	0.00	0.00
Common Merganser	0.00	2.40, 1.50	0.25, 0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.40, 0.40
Osprey	0.00	0.00	0.00	0.00	0.00	0.33, 0.33	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.60, 0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spotted Sandpiper	0.00	0.00	0.00	0.00	0.00	0.33, 0.33	0.00	0.00	0.00	0.00	0.00
Ring-billed Gull	0.80, 0.80	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00
Great Black-backed Gull	2.00, 2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Of the 62 species detected during VCP surveys, 45 (73%) were detected at stations located primarily managed landscapes (n=13), the primary available habitat at ROVA. Thirty-four species (55%) were detected in deciduous forest (n=11), 34 species (55%) in grassland or open habitat (n=6), 30 species (38%) in mixed forest, 24 species (39%) in forested wetland habitat, 20 species (32%) in wetlands, and 30 species (48%) at the single station located in conifer forest (Table 6-5).

Although the number of sampling stations (and therefore survey effort) varied by habitat type, it is interesting to note the high number of species (n=33) detected at stations located in freshwater and forested wetlands. Although these three habitats represent only 12% of the sampling stations, over 53% of the total species detected were found there.

Table 6-5. Habitat associations of species detected during VCP point count surveys.

Species	Managed Landscape (N=13)	Deciduous Forest (N=11)	Grassland (N=6)	Mixed Forest (N=5)	Forested Wetland (N=3)	Wetland (N=2)	Conifer Forest (N=1)
Green Heron	-	-	-	-	X	-	-
Black-crowned Night-Heron	-	-	-	X	-	-	-
Canada Goose	X	-	-	-	-	-	-
Mallard	X	-	-	-	-	X	-
Red-tailed Hawk	X	-	-	-	-	-	-
Wild Turkey	X	-	-	-	-	-	-
Ring-billed Gull	X	-	-	-	-	-	-
Mourning Dove	X	X	X	X	X	X	X
Yellow-billed Cuckoo	-	-	X	-	-	-	-
Chimney Swift	X	-	-	-	-	-	-
Red-bellied Woodpecker	X	X	X	X	X	X	X
Downy Woodpecker	-	X	X	X	X	-	-
Hairy Woodpecker	X	X	-	X	-	X	X
Northern Flicker	X	X	X	X	-	-	-
Pileated Woodpecker	X	X	-	X	X	-	X
Eastern Wood-Pewee	X	X	X	X	X	-	X
Willow Flycatcher	-	-	-	-	-	X	-
Eastern Phoebe	X	X	-	-	-	-	-
Great Crested Flycatcher	X	X	X	X	X	-	X
Eastern Kingbird	-	-	X	-	-	-	-
Yellow-throated Vireo	-	-	-	X	-	-	-
Warbling Vireo	X	X	-	-	X	X	-
Red-eyed Vireo	X	X	X	X	X	X	X
Blue Jay	X	X	X	X	X	-	-
American Crow	X	X	X	X	X	X	-
Barn Swallow	X	-	-	-	-	-	-
Tree Swallow	X	-	-	-	-	-	-
Black-capped Chickadee	X	X	X	X	X	X	X
Tufted Titmouse	X	X	X	X	X	X	-

Table 6-5. Habitat associations of species detected during VCP point count surveys (continued).

Species	Managed Landscape (N=13)	Deciduous Forest (N=11)	Grassland (N=6)	Mixed Forest (N=5)	Forested Wetland (N=3)	Wetland (N=2)	Conifer Forest (N=1)
White-breasted Nuthatch	X	X	-	X	X	-	-
Carolina Wren	-	X	X	-	-	-	-
House Wren	X	-	-	-	X	-	-
Blue-gray Gnatcatcher	-	-	X	-	-	-	-
Eastern Bluebird	-	-	X	-	-	-	-
Veery	X	X	X	X	-	-	-
Wood Thrush	X	X	X	X	X	-	X
American Robin	X	-	X	-	X	-	-
Gray Catbird	X	X	-	X	-	X	-
Northern Mockingbird	X	-	-	-	-	-	-
European Starling	X	-	X	-	-	-	-
Cedar Waxwing	X	-	X	-	-	-	-
Yellow Warbler	-	-	-	X	-	X	-
Black-and-White Warbler	X	-	-	-	-	-	-
American Redstart	-	X	X	-	-	-	-
Worm-eating Warbler	-	X	X	X	-	-	-
Ovenbird	X	X	-	X	-	-	-
Louisiana Waterthrush	-	X	-	X	X	-	-
Common Yellowthroat	-	X	X	-	-	X	-
Scarlet Tanager	X	X	X	X	-	-	X
Eastern Towhee	X	-	-	-	-	-	-
Chipping Sparrow	X	-	X	-	-	X	-
Song Sparrow	X	-	X	-	X	X	-
Northern Cardinal	X	X	X	X	X	X	X
Rose-breasted Grosbeak	-	X	-	X	X	-	X
Indigo Bunting	X	X	X	-	-	-	-
Red-winged Blackbird	X	X	X	X	X	X	-
Common Grackle	X	X	X	-	X	-	-
Brown-headed Cowbird	X	X	X	X	-	X	-

Table 6-5. Habitat associations of species detected during VCP point count surveys (continued).

Species	Managed Landscape (N=13)	Deciduous Forest (N=11)	Grassland (N=6)	Mixed Forest (N=5)	Forested Wetland (N=3)	Wetland (N=2)	Conifer Forest (N=1)
Baltimore Oriole	X	X	X	X	-	X	X
House Finch	X	-	-	-	-	-	-
American Goldfinch	X	X	X	X	X	X	-

Several stations at VAMA seemed to have relatively high numbers of individuals detected (sampling stations 5 and 8) when compared to other parks (Figure 6-2). However, many stations in all three parks had a relatively high number of species detected (Figure 6-3). The relative abundance of each species at each sampling station can be found in Appendix 6-A.

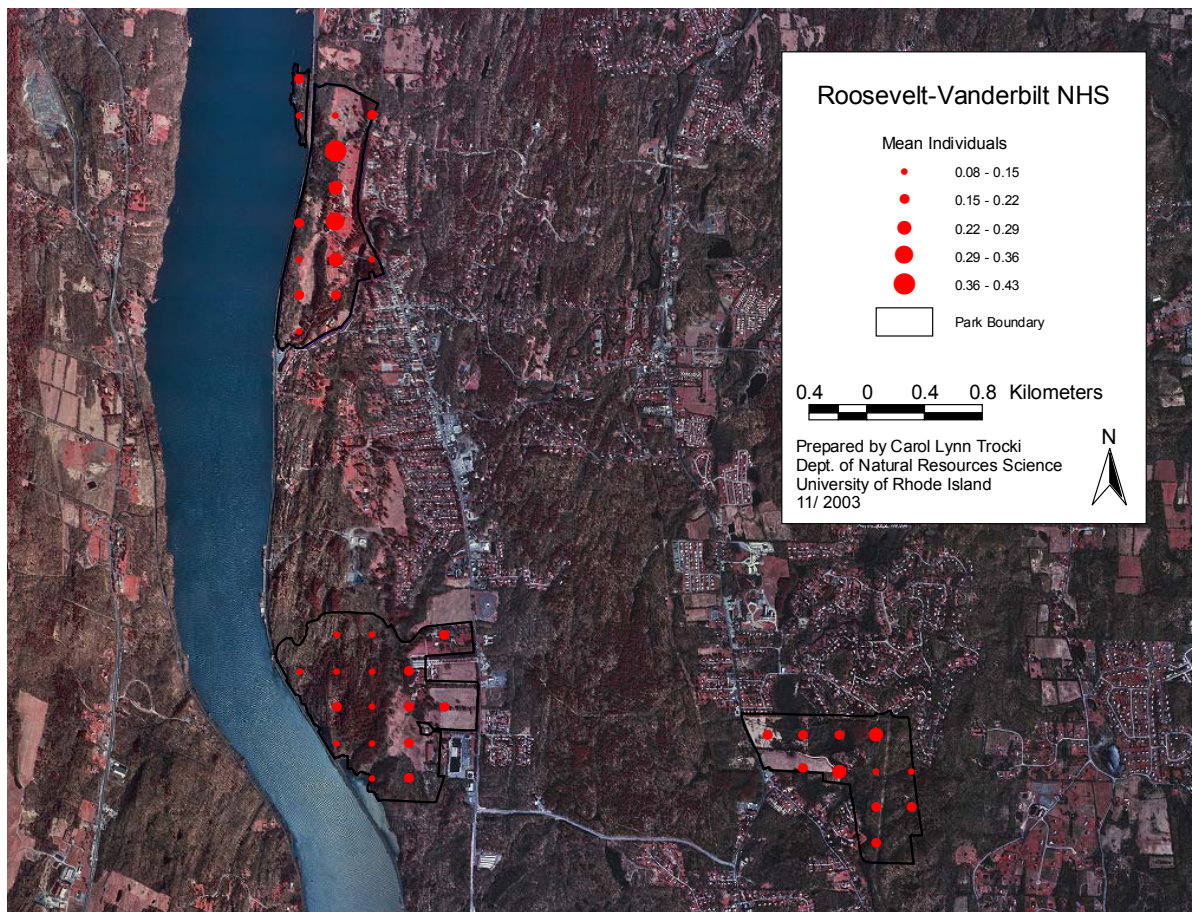


Figure 6-2. The mean number of individuals (all species combined) detected at each point count station in Roosevelt-Vanderbilt NHS during VCP surveys in 2002 and 2003.

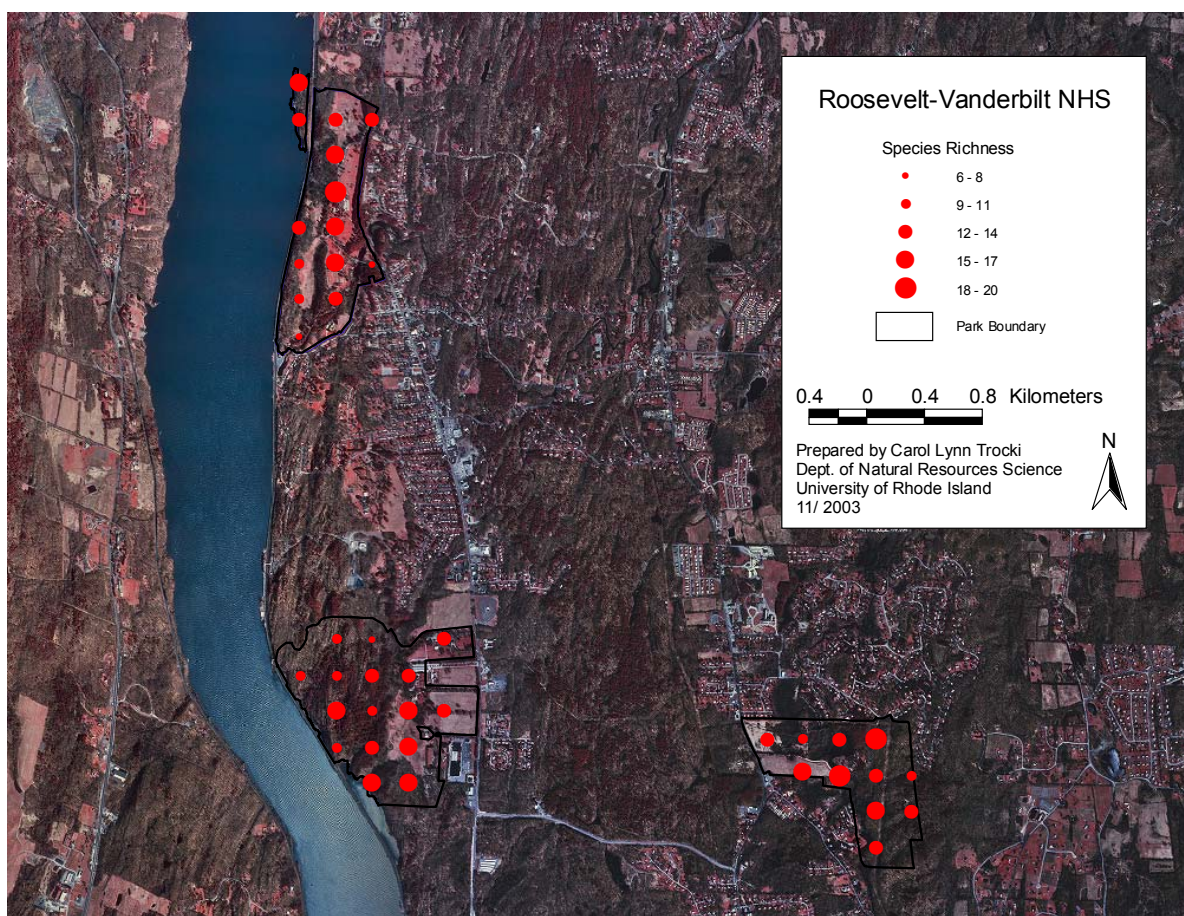


Figure 6-3. The total number of species detected at each point count station in Roosevelt-Vanderbilt NHS during VCP surveys in 2002 and 2003.

Chapter 7

Avian surveys in Northeast Temperate Network Parks:

Saratoga National Historical Park SARA

Background

Saratoga National Historical Park (SARA) was authorized by the United States Congress in 1938, after first being authorized as a New York state park in 1927 (<http://www.nps.gov/sara/index.htm>). The mission of the Park is to preserve and protect the battlefield and the sites associated with the 1777 surrender of British forces at Saratoga, a decisive event in the battle for American independence, and to interpret these and other sites, events, and people related to the military campaigns in the Champlain-Hudson and Mohawk valleys (SARA General Management Plan Newsletter; <http://www.nps.gov/sara/gmp0112.htm>).

The park is located on the upper Hudson River in an area possessing significant natural and cultural attractions appealing to a wide range of visitors from around the world. Park staff and local birders at SARA have compiled a list of 139 species known to occur within the park during some portion of the year, but information on spatial distribution throughout park habitats is lacking (Linda White, Park Biologist, SARA, personal communication).

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at SARA in 2002 and 2003. Prior to the 2002 breeding season, 220 randomly-generated point count sampling stations were established within the site, of which 134 were randomly selected for sampling (Figure 7-1). A random sample of approximately half of these stations was surveyed once during the breeding season in 2002, with the remainder surveyed once during the breeding season in 2003 (Table 7-1).

Forty-four of the sampling stations (33%) were located in forested habitat and another 44 (33%) were located primarily in early successional / edge habitat. Eighteen stations (13%) were located in grasslands (including field crops), 8 (6%) in agricultural fields (sod or row crops), 8 (6%) in forested areas adjacent to streams, 5 (4%) in wet fields, 5 (4%) in developed areas, and 2 (2%) in forested wetlands (Table 7-1).

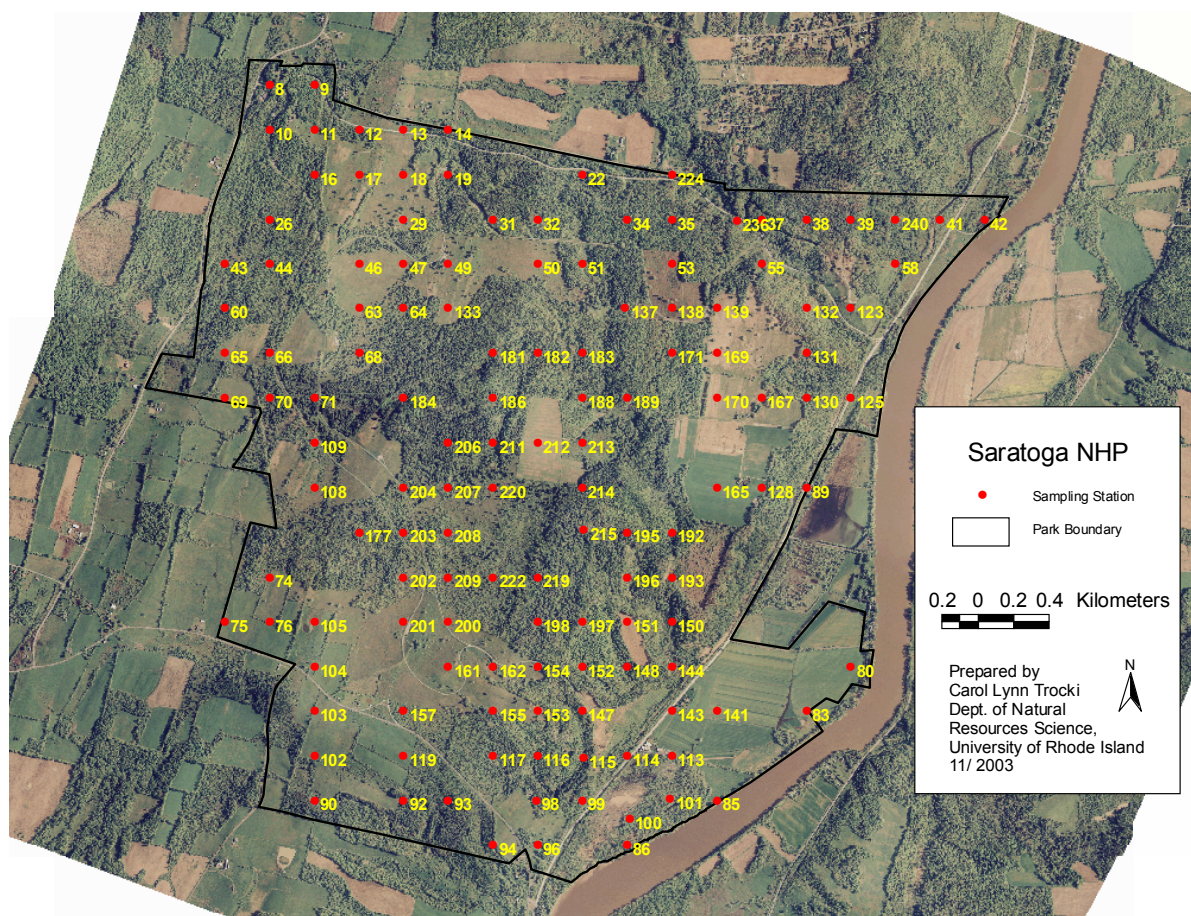


Figure 7-1. Locations of point count stations in Saratoga National Historical Park (SARA) surveyed during the breeding season in 2002 and 2003.

Table 7-1. UTM coordinates of point count stations in Saratoga NHP, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station.

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
8	609980	4763221	1	0	Forest
9	610229	4763221	1	0	Forest
10	609979	4762971	1	0	Forest
11	610230	4762971	1	0	Grassland
12	610480	4762971	1	0	Forest
13	610730	4762971	1	0	Forest
14	610980	4762971	1	0	Forest
16	610230	4762721	1	0	Forest
17	610480	4762721	0	1	Early Successional / Edge
18	610730	4762721	0	1	Early Successional / Edge
19	610980	4762721	0	1	Developed
22	611730	4762721	0	1	Early Successional / Edge
26	609980	4762471	1	0	Forest
29	610730	4762471	1	0	Wet Field
31	611230	4762471	1	0	Forest
32	611480	4762471	0	1	Forest
34	611980	4762471	0	1	Forest
35	612230	4762471	1	0	Forest
37	612730	4762471	1	0	Forest
38	612980	4762471	1	0	Forest
39	613230	4762471	1	0	Forest
41	613730	4762471	0	1	Forest
42	613980	4762471	1	0	Forest, Stream
43	609730	4762221	0	1	Forest
44	609980	4762221	1	0	Forest
46	610480	4762221	0	1	Grassland
47	610730	4762221	0	1	Grassland
49	610980	4762221	0	1	Early Successional / Edge
50	611480	4762221	0	1	Early Successional / Edge
51	611730	4762221	1	0	Forest
53	612230	4762221	1	0	Grassland
55	612730	4762221	1	0	Developed
58	613480	4762221	0	1	Early Successional / Edge
60	609730	4761971	1	0	Forest
63	610480	4761971	1	0	Grassland
64	610730	4761971	1	0	Early Successional / Edge
65	609730	4761721	0	1	Early Successional / Edge
66	609980	4761721	0	1	Early Successional / Edge
68	610480	4761721	0	1	Forest
69	609730	4761471	1	0	Grassland
70	609980	4761471	1	0	Wetland Forest
71	610230	4761471	0	1	Forest
74	609980	4760471	0	1	Early Successional / Edge
75	609730	4760221	0	1	Early Successional / Edge
76	609980	4760221	1	0	Early Successional / Edge
80	613230	4759970	0	1	Agricultural Field

Table 7-1. UTM coordinates of point count stations in Saratoga NHP, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station (continued).

Station Number	UTM E	UTM N	# Visits 2002	# Visits 2003	Habitat Type
83	612980	4759721	0	1	Agricultural Field
85	612480	4759221	0	1	Early Successional / Edge
86	611980	4758971	0	1	Forest, Stream
89	612980	4760971	0	1	Developed
90	610230	4759221	0	1	Forest
92	610730	4759221	1	0	Early Successional / Edge
93	610980	4759221	0	1	Forest
94	611230	4758971	0	1	Early Successional / Edge
96	611480	4758971	1	0	Early Successional / Edge
98	611470	4759221	0	1	Early Successional / Edge
99	611730	4759221	1	0	Early Successional / Edge
100	611993	4759117	0	1	Wet Field
101	612221	4759230	0	1	Wetland Forest
102	610230	4759471	0	1	Early Successional / Edge
103	610230	4759721	1	0	Early Successional / Edge
104	610230	4759971	1	0	Grassland
105	610230	4760221	1	0	Grassland
108	610230	4760971	1	0	Wet Field
109	610230	4761221	1	0	Early Successional / Edge
113	612230	4759471	0	1	Agricultural Field
114	611980	4759471	1	0	Early Successional / Edge
115	611736	4759459	0	1	Forest, Stream
116	611180	4759471	0	1	Forest, Stream
117	611230	4759471	0	1	Forest
119	610730	4759471	0	1	Early Successional / Edge
123	613230	4761971	0	1	Early Successional / Edge
125	613230	4761471	1	0	Developed
128	612730	4760971	0	1	Agricultural Field
130	612980	4761471	1	0	Grassland
131	612980	4761721	1	0	Early Successional / Edge
132	612980	4761971	0	1	Forest
133	610980	4761971	0	1	Grassland
137	611970	4761971	0	1	Forest
138	612230	4761971	0	1	Early Successional / Edge
139	612480	4761971	0	1	Early Successional / Edge
141	612480	4759721	0	1	Agricultural Field
143	612230	4759721	0	1	Agricultural Field
144	612230	4759971	0	1	Wet Field
147	611730	4759721	1	0	Early Successional / Edge
148	611980	4759971	0	1	Forest
150	612230	4760221	0	1	Forest, Stream
151	611980	4760221	0	1	Early Successional / Edge
152	611730	4759971	0	1	Forest, Stream
153	611480	4759721	1	0	Early Successional / Edge
154	611480	4759971	0	1	Early Successional / Edge

Table 7-1. UTM coordinates of point count stations in Saratoga NHP, number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station (continued).

Station Number	UTM E	UTM N	# Visits 2002	# Visits 2003	Habitat Type
155	611230	4759721	1	0	Early Successional / Edge
157	610730	4759721	0	1	Early Successional / Edge
161	610980	4759971	1	0	Grassland
162	611230	4759971	1	0	Grassland
165	612480	4760971	0	1	Agricultural Field
167	612730	4761471	0	1	Early Successional / Edge
169	612480	4761721	0	1	Grassland
170	612480	4761471	0	1	Grassland
171	612230	4761721	1	0	Forest
177	610480	4760721	1	0	Wet Field
181	611230	4761721	1	0	Forest
182	611480	4761721	1	0	Forest
183	611730	4761721	1	0	Forest
184	610730	4761471	1	0	Forest
186	611230	4761471	1	0	Forest
188	611730	4761471	0	1	Forest
189	611980	4761471	1	0	Forest
192	612230	4760721	0	1	Forest, Stream
193	612230	4760471	0	1	Early Successional / Edge
195	611980	4760721	0	1	Forest, Stream
196	611980	4760471	1	0	Early Successional / Edge
197	611730	4760221	0	1	Forest
198	611480	4760221	0	1	Forest
200	610980	4760221	0	1	Grassland
201	610730	4760221	0	1	Grassland
202	610730	4760471	0	1	Early Successional / Edge
203	610730	4760721	0	1	Early Successional / Edge
204	610730	4760971	1	0	Early Successional / Edge
206	610980	4761221	1	0	Forest
207	610980	4760971	1	0	Grassland
208	610980	4760721	0	1	Early Successional / Edge
209	610980	4760471	0	1	Early Successional / Edge
211	611230	4761221	1	0	Forest
212	611480	4761221	0	1	Agricultural Field
213	611730	4761221	0	1	Early Successional / Edge
214	611730	4760971	1	0	Grassland
215	611739	4760732	0	1	Forest
219	611480	4760471	1	0	Forest
220	611230	4760971	0	1	Early Successional / Edge
222	611230	4760471	0	1	Early Successional / Edge
224	612230	4762721	0	1	Developed
236	612592	4762460	0	1	Forest
240	613480	4762471	0	1	Forest

Survey Results

A total of 73 species were detected in SARA during field surveys in 2002 and 2003 (Table 7-2). Of these, 69 (95%) were detected during VCP point count surveys conducted during the breeding season.

Breeding species were defined as those species with a relative abundance of ≥ 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g. visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, 40 species (58%) detected during VCP surveys breed within the park. Only two species (3%), Song Sparrow and Common Yellowthroat were detected at $\geq 50\%$ of the sampling stations within the park (Table 7-2). Song Sparrows ($\bar{x} = 0.96$, SE = 0.08), Red-winged Blackbirds ($\bar{x} = 0.75$, SE = 0.15), and Common Yellowthroats ($\bar{x} = 0.68$, SE = 0.06) were the most abundant species detected (Table 7-2).

Table 7-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Saratoga NHP during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=134)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Great Blue Heron	-	-	B	-
Canada Goose	0.01 \pm 0.01	1	L	-
Wood Duck	0.07 \pm 0.07	1	B	IIB
Mallard	0.01 \pm 0.01	1	L	-
American Kestrel	0.01 \pm 0.01	1	L	-
Killdeer	0.01 \pm 0.01	1	L	-
Spotted Sandpiper	-	-	L	-
Rock Dove	0.01 \pm 0.01	1	L	-
Mourning Dove	0.22 \pm 0.04	20	B	-
Ruby-throated Hummingbird	0.01 \pm 0.01	1	L	-
Belted Kingfisher	0.01 \pm 0.01	1	L	-
Yellow-bellied Sapsucker	0.01 \pm 0.01	1	L	-
Downy Woodpecker	0.06 \pm 0.02	6	B	-
Hairy Woodpecker	0.02 \pm 0.01	2	L	-
Northern Flicker	0.07 \pm 0.03	7	B	-
Pileated Woodpecker	0.04 \pm 0.02	4	L	-
Eastern Wood-Pewee	0.24 \pm 0.04	21	B	IIA
Yellow-bellied Flycatcher	0.01 \pm 0.01	1	L	-
Alder Flycatcher	0.05 \pm 0.02	5	B	-
Eastern Phoebe	0.04 \pm 0.02	4	L	-
Great Crested Flycatcher	0.13 \pm 0.03	13	B	-
Eastern Kingbird	0.11 \pm 0.03	9	B	-
Warbling Vireo	0.01 \pm 0.01	1	L	-
Yellow-throated Vireo	0.02 \pm 0.01	2	L	-
Blue-headed Vireo	0.01 \pm 0.01	1	L	-
Red-eyed Vireo	0.30 \pm 0.05	25	B	-
Blue Jay	0.42 \pm 0.05	37	B	-
American Crow	0.43 \pm 0.05	36	B	-
Tree Swallow	0.14 \pm 0.11	4	B	-
Barn Swallow	-	-	L	-
Black-capped Chickadee	0.39 \pm 0.07	25	B	-
Tufted Titmouse	0.07 \pm 0.02	7	B	-
Red-breasted Nuthatch	0.01 \pm 0.01	1	L	-
White-breasted Nuthatch	0.06 \pm 0.02	6	B	-
House Wren	0.08 \pm 0.02	8	B	-
Eastern Bluebird	0.01 \pm 0.01	1	L	-

Table 7-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Saratoga NHP during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm SE$ (n=134)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Veery	0.10 ± 0.03	7	B	-
Swainson's Thrush	0.01 ± 0.01	1	L	-
Hermit Thrush	0.17 ± 0.04	13	B	-
Wood Thrush	0.18 ± 0.05	13	B	I
American Robin	0.56 ± 0.08	36	B	-
Gray Catbird	0.23 ± 0.04	19	B	III
European Starling	0.16 ± 0.05	8	B	-
Cedar Waxwing	0.21 ± 0.05	13	B	-
Nashville Warbler	0.01 ± 0.01	1	L	-
Yellow Warbler	0.27 ± 0.05	21	B	-
Chestnut-sided Warbler	0.01 ± 0.01	1	L	-
Pine Warbler	0.01 ± 0.01	1	L	-
Prairie Warbler	0.07 ± 0.02	7	B	III
Black-and-White Warbler	0.15 ± 0.03	15	B	-
American Redstart	0.01 ± 0.01	1	L	-
Ovenbird	0.37 ± 0.05	29	B	-
Louisiana Waterthrush	0.02 ± 0.02	1	L	I
Common Yellowthroat	0.68 ± 0.06	54	B	-
Scarlet Tanager	0.02 ± 0.01	2	L	IIB
Eastern Towhee	0.16 ± 0.04	13	B	IIA
Chipping Sparrow	0.11 ± 0.04	8	B	-
Field Sparrow	0.32 ± 0.05	26	B	I
Savannah Sparrow	0.01 ± 0.01	1	L	-
Song Sparrow	0.96 ± 0.08	60	B	-
Swamp Sparrow	0.01 ± 0.01	1	L	-
Northern Cardinal	0.19 ± 0.04	16	B	-
Rose-breasted Grosbeak	0.07 ± 0.02	7	B	-
Indigo Bunting	0.07 ± 0.02	6	B	-
Bobolink	0.45 ± 0.13	16	B	III
Red-winged Blackbird	0.75 ± 0.15	33	B	-
Eastern Meadowlark	0.28 ± 0.06	18	B	-
Common Grackle	0.02 ± 0.01	2	L	-
Brown-headed Cowbird	0.07 ± 0.03	6	B	-
Baltimore Oriole	0.03 ± 0.01	3	L	IIA
Purple Finch	0.01 ± 0.01	1	R	-

Table 7-2. Relative abundance ($\bar{x} \pm \text{SE}$ per point count station) of birds detected at Saratoga NHP during breeding season point counts in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Species	$\bar{x} \pm \text{SE}$ (n=134)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
American Goldfinch	0.49 \pm 0.06	38	B	-

^a **Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park; L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown, R – local resident outside of the breeding season, M - migrant

^b **PIF Priority Species Designations:** I - High Continental Priority; IIA - High Regional Concern; IIB – High Regional Responsibility; IIC – High Regional Threats; III – U.S. National Watch List

Of species breeding in the park, five are listed by Partners In Flight as conservation priorities for the Northern Ridge and Valley Physiographic Area (Area 17; http://www.blm.gov/wildlife/pl_17sum.htm). Field Sparrow and Wood Thrush are listed by PIF as species of continental conservation priority, while Eastern Wood-Pewee, Eastern Towhee, and Wood Duck are all listed as a high regional conservation priority. While Wood Thrushes and Eastern Wood-Pewees are generally associated with deciduous forest, Eastern Towhees and Field Sparrows rely on early successional and edge habitat (DeGraaf and Rappole 1995). Wood Ducks are cavity-nesters that primarily breed in forested wetlands (DeGraaf and Rappole 1995), and were observed in a flock on only one occasion during VCP surveys in Saratoga.

PIF also lists Gray Catbird, Prairie Warbler, and Bobolink, all of which nest in the park, as species on the U.S. National Watch List. None of the species breeding in Saratoga are federally or state listed.

Although not detected with a high enough frequency to meet the breeding species criteria used in this survey, several other species of conservation interest may breed in the park based on their current distributions and known habitat requirements (National Geographic 1999). PIF lists Louisiana Waterthrush as a species of continental conservation priority, and both Scarlet Tanager and Baltimore Oriole as species of regional priority.

Of the 69 species detected during VCP surveys, 47 (68%) were detected at forested stations (N=44), 51 (74%) at early successional / edge stations (N=44), 42 (61%) at grassland stations (N=18), 28 (41%) at forested stations adjacent to streams (N=8), 20 (29%) at station located in agricultural field (N=8), 25 (36%) in stations in developed areas (N=5), 25 (36%) in wet field stations (N=5), and 14 species (20%) in wetland forest stations (N=2) (Table 7-3). Although the number of sampling stations (and therefore survey effort) varied by habitat type, it is interesting to note the high number of species (N=42) detected at grassland stations, given that this habitat type represents only 13% of the stations surveyed.

Table 7-3. Habitat associations of species detected during VCP point count surveys.

Species	Forest (N=44)	Early Successional (N=44)	Grassland (N=18)	Forest, Stream (N=8)	Agricultural Field (N=8)	Developed (N=5)	Wet Field (N=5)	Wetland Forest (N=2)
Canada Goose	X	-	-	-	-	-	-	-
Wood Duck	-	-	-	-	-	-	-	X
Mallard	-	X	-	-	-	-	-	-
American Kestrel	-	-	X	-	-	-	-	-
Killdeer	-	-	-	-	-	-	X	-
Rock Dove	-	X	-	-	-	-	-	-
Mourning Dove	X	X	X	X	X	X	X	X
Ruby-throated Hummingbird	-	-	-	X	-	-	-	-
Belted Kingfisher	-	-	-	X	-	-	-	-
Yellow-bellied Sapsucker	X	-	-	-	-	-	-	-
Downy Woodpecker	X	-	X	X	-	-	-	-
Hairy Woodpecker	X	-	X	-	-	-	-	-
Northern Flicker	X	X	X	-	-	X	X	-
Pileated Woodpecker	X	-	X	-	-	-	-	-
Eastern Wood-Pewee	X	X	X	X	X	-	X	-
Yellow-bellied Flycatcher	X	-	-	-	-	-	-	-
Alder Flycatcher	-	X	X	-	-	-	-	-
Eastern Phoebe	X	X	-	-	-	X	-	-
Great Crested Flycatcher	X	X	X	-	-	-	-	-
Eastern Kingbird	X	X	X	X	-	-	X	-
Yellow-throated Vireo	-	X	X	X	-	-	-	-
Blue-headed Vireo	X	X	-	-	-	-	-	-
Warbling Vireo	-	-	-	X	-	-	-	-
Red-eyed Vireo	X	X	X	X	X	X	-	-
Blue Jay	X	X	X	X	-	X	X	X
American Crow	X	X	X	X	X	-	X	X
Tree Swallow	-	X	X	X	-	-	-	-
Black-capped Chickadee	X	X	X	X	X	X	X	-
Tufted Titmouse	X	X	-	-	-	X	X	-

Table 7-3. Habitat associations of species detected during VCP point count surveys (continued).

Species	Forest (N=44)	Early Successional (N=44)	Grassland (N=18)	Forest, Stream (N=8)	Agricultural Field (N=8)	Developed (N=5)	Wet Field (N=5)	Wetland Forest (N=2)
Red-breasted Nuthatch	-	X	-	-	-	-	-	-
White-breasted Nuthatch	X	X	X	-	-	X	-	-
House Wren	X	X	X	-	-	-	-	X
Eastern Bluebird	-	X	-	-	-	-	-	-
Veery	X	X	-	X	-	X	-	-
Swainson's Thrush	X	-	-	-	-	-	-	-
Hermit Thrush	X	X	X	X	-	-	-	-
Wood Thrush	X	X	X	X	X	-	X	X
American Robin	X	X	X	X	X	X	X	-
Gray Catbird	X	X	X	X	-	X	-	X
European Starling	X	X	X	-	X	X	-	-
Cedar Waxwing	X	X	X	X	X	X	X	-
Nashville Warbler	-	X	-	-	-	-	-	-
Yellow Warbler	X	X	X	X	X	X	-	-
Chestnut-sided Warbler	-	X	-	-	-	-	-	-
Pine Warbler	-	X	-	-	-	-	-	-
Prairie Warbler	X	X	X	-	-	-	X	X
Black-and-White Warbler	X	X	X	-	X	-	X	-
American Redstart	X	-	-	-	-	-	-	-
Ovenbird	X	X	X	X	X	X	X	-
Louisiana Waterthrush	X	-	-	-	-	X	-	-
Common Yellowthroat	X	X	X	X	X	X	X	X
Scarlet Tanager	X	X	-	-	-	-	-	-
Eastern Towhee	X	X	X	-	-	-	X	X
Chipping Sparrow	X	X	X	-	X	-	X	-
Field Sparrow	X	X	X	-	-	X	X	X
Savannah Sparrow	-	-	-	-	X	-	-	-
Song Sparrow	X	X	X	X	X	X	X	X
Swamp Sparrow	-	-	-	-	-	-	X	-

Table 7-3. Habitat associations of species detected during VCP point count surveys (continued).

Species	Forest (N=44)	Early Successional (N=44)	Grassland (N=18)	Forest, Stream (N=8)	Agricultural Field (N=8)	Developed (N=5)	Wet Field (N=5)	Wetland Forest (N=2)
Northern Cardinal	X	X	X	-	X	-	X	-
Rose-breasted Grosbeak	X	X	X	X	X	-	-	-
Indigo Bunting	-	X	X	X	-	X	-	-
Bobolink	X	X	X	-	-	-	X	-
Red-winged Blackbird	X	X	X	X	X	X	X	X
Eastern Meadowlark	X	X	X	-	-	-	-	-
Common Grackle	-	-	-	X	-	X	-	-
Brown-headed Cowbird	X	X	X	-	-	X	-	-
Baltimore Oriole	-	X	X	-	-	-	-	-
Purple Finch	-	X	-	-	-	X	-	-
American Goldfinch	X	X	X	X	X	X	X	X

The distribution of individuals and species in SARA varied between stations, but no clear patterns exist. Figure 7-2 shows the mean number of individuals detected at each sampling station, while Figure 7-3 shows the total number of species detected at each sampling station. The relative abundance of each species at each sampling station can be found in Appendix 7-A.

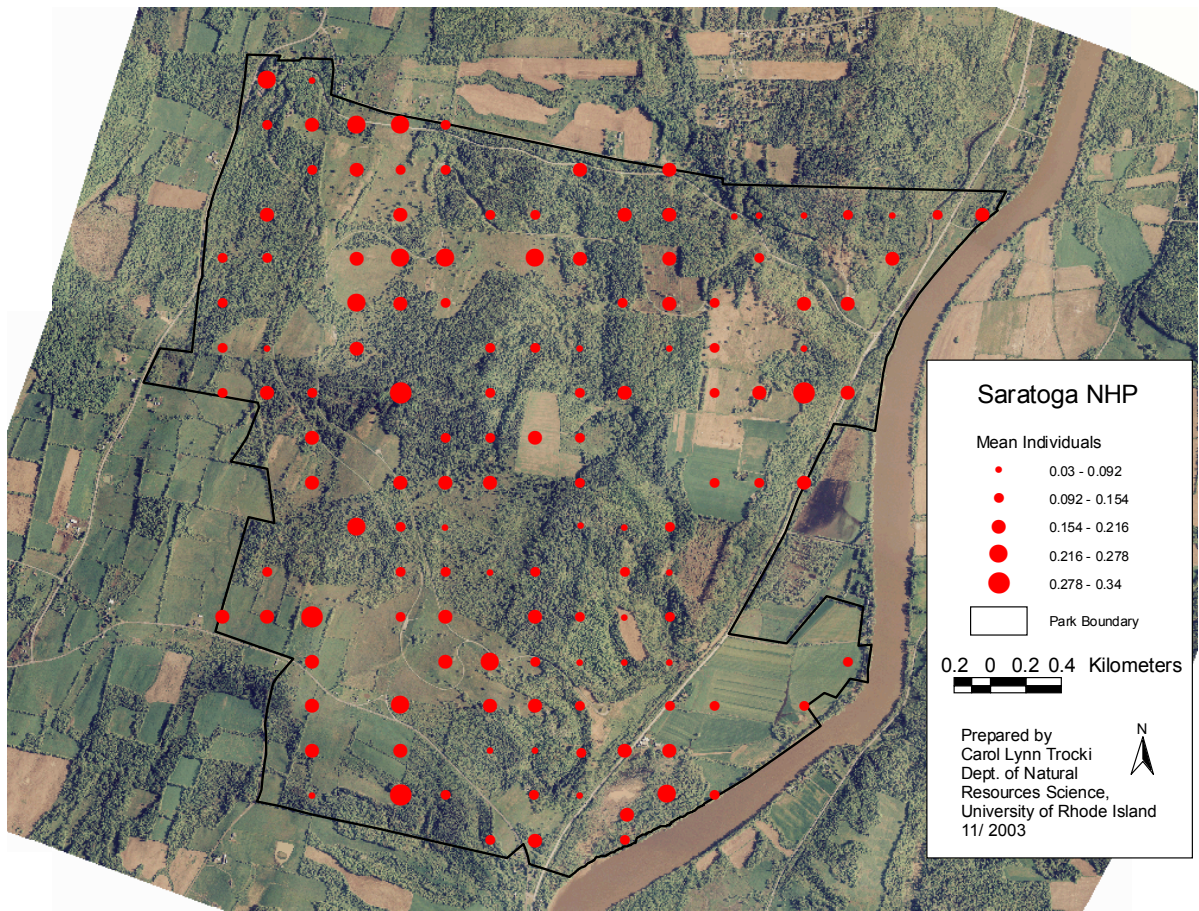


Figure 7-2. The mean number of individuals (all species combined) detected at each point count station in Saratoga NHP during VCP surveys in 2002 and 2003.

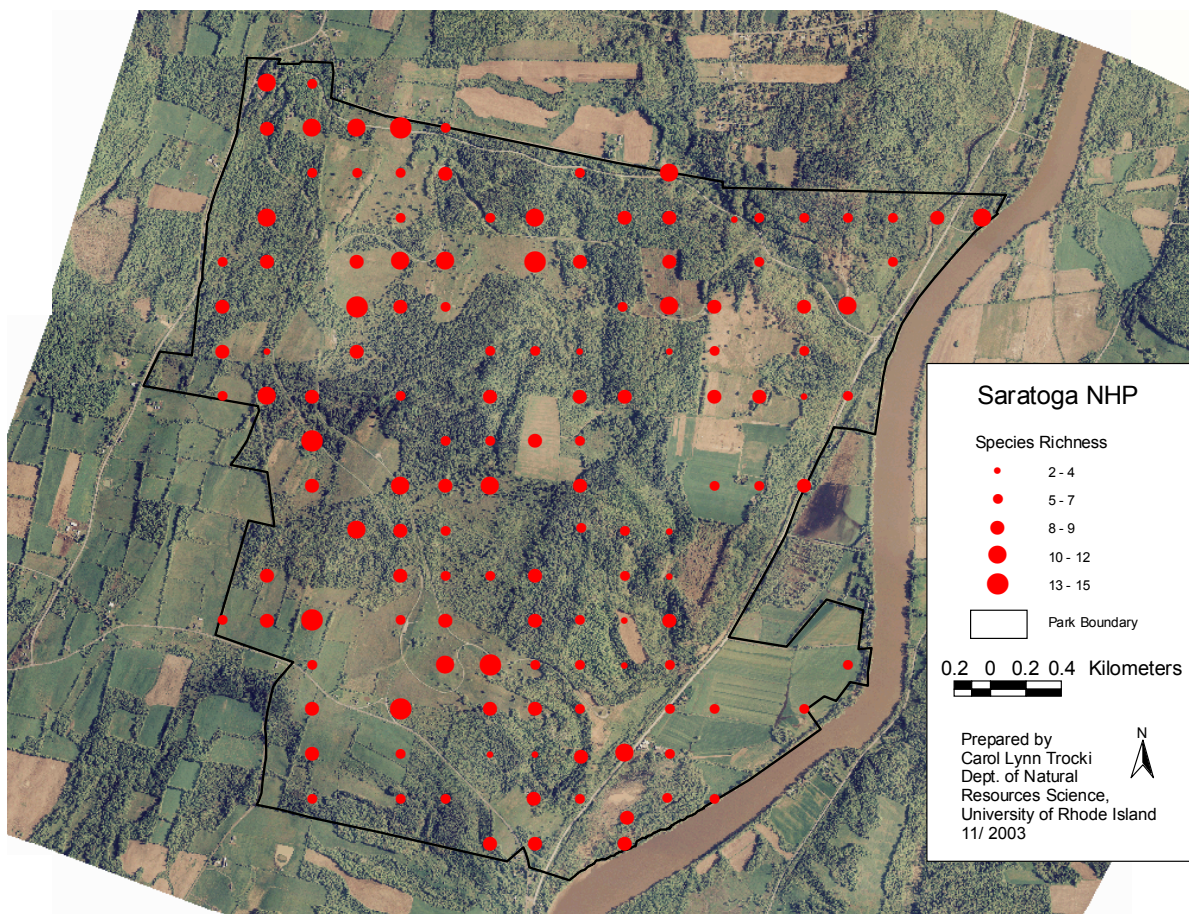


Figure 7-3. The total number of species detected at each point count station in Saratoga NHP during VCP surveys in 2002 and 2003.

Chapter 8

Avian surveys in Northeast Temperate Network Parks:

Morristown National Historical Park (MORR)

Background

Morristown National Historical Park (MORR), the first national historical park in the national park system, was established on March 2, 1933 for the purpose of preserving the lands and features associated with the grim winter encampments of the Continental Army during the War for Independence. The park is comprised of 1,698 acres situated in north central New Jersey, approximately 30 miles west of New York City (Morristown Draft General Management Plan and Environmental Impact Statement 2003).

The land inside the park's boundaries consists of several ridges that border narrow valleys, with several small streams meandering through the valleys. The forests of the park are northern deciduous hardwood forests, of which approximately 60% are mature (150-200 years old) and 40% are successional (100-150 years old). The rolling forested hills, fields, and babbling brooks weave a natural tapestry that provides a sense of the 18th century pre-encampment landscape (<http://www.nps.gov/morr/pphtml/naturalfeatures.html>). Park staff and local volunteers at MORR have compiled a list of 119 bird species known to occur within the park during some portion of the year, but information on spatial distribution throughout park habitats is lacking (Robert Masson, Natural Resources Specialist, MORR, personal communication).

Sampling Stations

Variable Circular Plot (VCP) point count surveys were conducted at MORR in 2002 and 2003. Prior to the 2002 breeding season, 110 randomly-generated point count sampling stations were established within the Park (Figure 8-1). A random sample of approximately 50% of these stations was surveyed once during the breeding season in 2002, with the remainder surveyed once during the breeding season in 2003 (Table 8-1).

Ninety of the sampling stations (82%) were located in deciduous forest. Seven stations (6%) were located in forested wetlands, seven (6%) in early successional / edge habitat, five (5%) in forested habitat adjacent to streams. One station (1%) was located in conifer forest (Table 8-1).

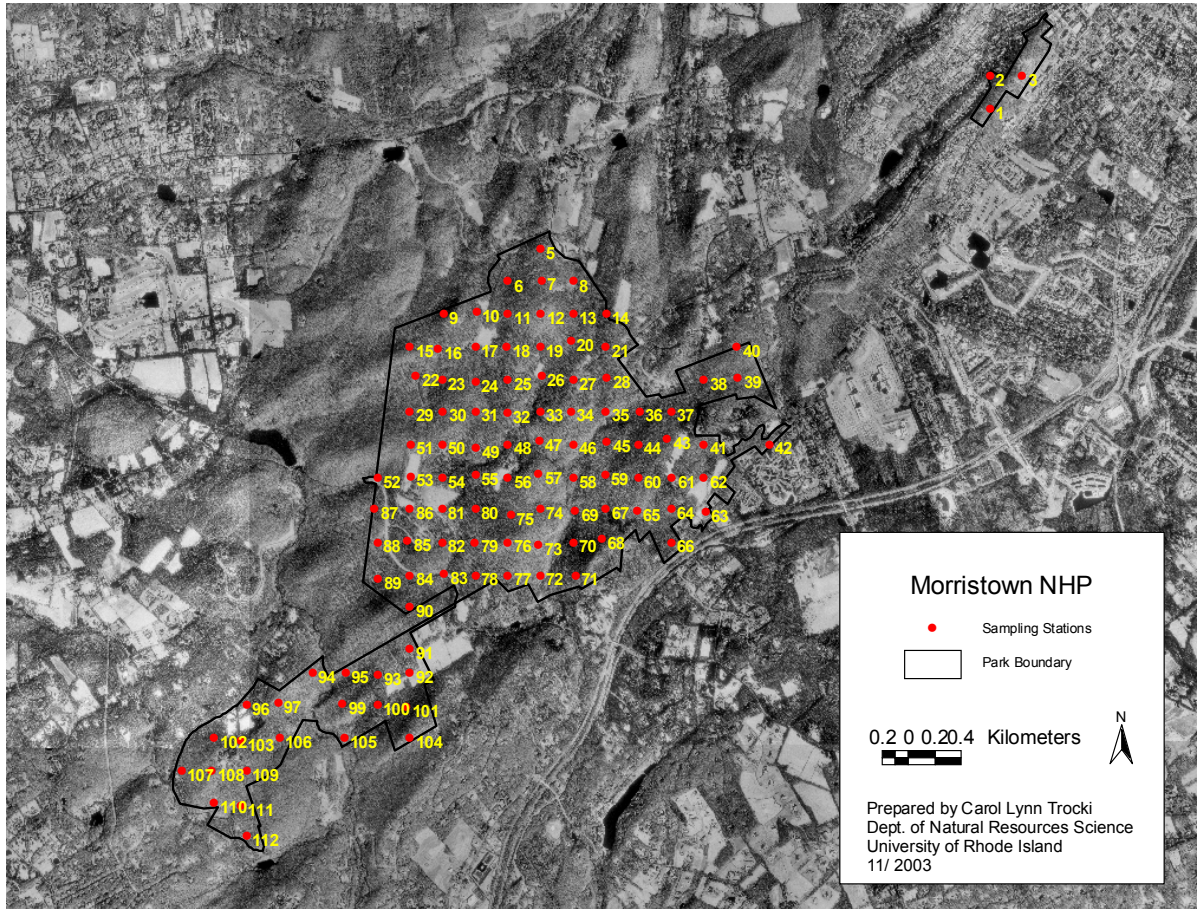


Figure 8-1. Locations of point count stations in Morristown National Historical Park (MORR) surveyed during the breeding season in 2002 and 2003.

Table 8-1. UTM coordinates of point count stations in Morristown NHP, the number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station.

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
1	542939	4515651	1	0	Deciduous Forest
2	542939	4515901	1	0	Deciduous Forest
3	543189	4515901	1	0	Deciduous Forest
5	539501	4514583	1	0	Deciduous Forest
6	539251	4514333	1	0	Deciduous Forest
7	539505	4514337	0	1	Deciduous Forest
8	539751	4514333	1	0	Deciduous Forest
9	538757	4514084	1	0	Deciduous Forest
10	539010	4514091	0	1	Deciduous Forest
11	539251	4514083	1	0	Deciduous Forest
12	539504	4514088	0	1	Deciduous Forest
13	539751	4514083	1	0	Deciduous Forest
14	540005	4514087	0	1	Deciduous Forest
15	538501	4513833	1	0	Deciduous Forest
16	538719	4513812	0	1	Deciduous Forest
17	539001	4513833	1	0	Deciduous Forest
18	539242	4513833	0	1	Deciduous Forest
19	539501	4513833	1	0	Deciduous Forest
20	539731	4513875	0	1	Forested Wetland
21	540001	4513833	1	0	Deciduous Forest
22	538546	4513610	0	1	Deciduous Forest
23	538751	4513583	1	0	Deciduous Forest
24	539001	4513562	0	1	Forested Wetland
25	539251	4513583	1	0	Deciduous Forest
26	539509	4513610	0	1	Early Successional / Edge
27	539751	4513583	1	0	Deciduous Forest
28	540008	4513592	0	1	Deciduous Forest
29	538501	4513333	1	0	Deciduous Forest
30	538755	4513339	0	1	Deciduous Forest
31	539001	4513333	1	0	Deciduous Forest
32	539245	4513325	0	1	Deciduous Forest
33	539501	4513333	1	0	Deciduous Forest
34	539731	4513338	0	1	Deciduous Forest
35	540001	4513333	1	0	Deciduous Forest
36	540256	4513336	0	1	Deciduous Forest, Stream
37	540501	4513333	1	0	Deciduous Forest
38	540751	4513583	1	0	Deciduous Forest
39	541011	4513586	0	1	Deciduous Forest
40	541001	4513833	1	0	Deciduous Forest
41	540751	4513083	1	0	Deciduous Forest
42	541251	4513083	1	0	Deciduous Forest

Table 8-1. UTM coordinates of point count stations in Morristown NHP, the number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station (continued).

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
43	540470	4513124	0	1	Deciduous Forest
44	540251	4513083	1	0	Deciduous Forest
45	540010	4513102	0	1	Deciduous Forest
46	539751	4513083	1	0	Deciduous Forest
47	539487	4513109	0	1	Forested Wetland
48	539251	4513083	1	0	Deciduous Forest
49	539008	4513052	0	1	Deciduous Forest
50	538751	4513083	1	0	Deciduous Forest
51	538505	4513078	0	1	Deciduous Forest
52	538251	4512833	1	0	Deciduous Forest
53	538506	4512837	0	1	Early Successional / Edge
54	538751	4512833	1	0	Deciduous Forest
55	539003	4512844	0	1	Deciduous Forest
56	539251	4512833	1	0	Deciduous Forest
57	539484	4512853	0	1	Deciduous Forest
58	539751	4512833	1	0	Forested Wetland
59	539995	4512851	0	1	Deciduous Forest
60	540251	4512833	1	0	Deciduous Forest
61	540505	4512832	0	1	Early Successional / Edge
62	540751	4512833	1	0	Deciduous Forest
63	540764	4512565	0	1	Early Successional / Edge
64	540501	4512583	1	0	Deciduous Forest
65	540239	4512577	0	1	Deciduous Forest
66	540501	4512333	1	0	Deciduous Forest
67	540001	4512583	1	0	Deciduous Forest
68	539969	4512356	0	1	Deciduous Forest
69	539766	4512578	0	1	Forested Wetland
70	539751	4512333	1	0	Deciduous Forest
71	539771	4512082	0	1	Deciduous Forest
72	539501	4512083	1	0	Deciduous Forest
73	539485	4512313	0	1	Deciduous Forest
74	539501	4512583	1	0	Deciduous Forest
75	539271	4512541	0	1	Deciduous Forest
76	539251	4512333	1	0	Deciduous Forest
77	539250	4512083	0	1	Deciduous Forest
78	539001	4512083	1	0	Deciduous Forest
79	538999	4512330	0	1	Deciduous Forest
80	539001	4512583	1	0	Deciduous Forest
81	538750	4512587	0	1	Early Successional / Edge
82	538751	4512333	1	0	Deciduous Forest

Table 8-1. UTM coordinates of point count stations in Morristown NHP, the number of visits to each station during the breeding season in 2002 and 2003, and the dominant habitat type at each station (continued).

Station Number	UTM X	UTM Y	# Visits 2002	# Visits 2003	Habitat Type
83	538763	4512087	0	1	Forested Wetland
84	538501	4512083	1	0	Deciduous Forest, Stream
85	538484	4512339	0	1	Deciduous Forest
86	538501	4512583	1	0	Early Successional / Edge
87	538231	4512588	0	1	Deciduous Forest
88	538251	4512333	1	0	Deciduous Forest, Stream
89	538258	4512051	0	1	Deciduous Forest
90	538501	4511833	1	0	Deciduous Forest
91	538501	4511518	1	0	Deciduous Forest
92	538501	4511329	0	1	Early Successional / Edge
93	538256	4511320	0	1	Deciduous Forest
94	537754	4511331	0	1	Deciduous Forest
95	538007	4511330	0	1	Deciduous Forest
96	537251	4511083	1	0	Deciduous Forest
97	537494	4511102	0	1	Deciduous Forest
99	537986	4511097	0	1	Deciduous Forest
100	538251	4511083	1	0	Deciduous Forest
101	538474	4511082	0	1	Deciduous Forest
102	537001	4510833	1	0	Deciduous Forest
103	537209	4510819	0	1	Conifer Forest
104	538501	4510833	1	0	Deciduous Forest
105	538001	4510833	1	0	Deciduous Forest, Stream
106	537501	4510833	1	0	Deciduous Forest
107	536751	4510583	1	0	Forested Wetland
108	536985	4510585	0	1	Deciduous Forest
109	537251	4510583	1	0	Deciduous Forest
110	537001	4510333	1	0	Deciduous Forest, Stream
111	537211	4510323	0	1	Deciduous Forest
112	537251	4510083	1	0	Deciduous Forest

Survey Results

A total of 72 species were detected in MORR during field surveys in 2002 and 2003 (Table 8-2). Of these, 64 (89%) were detected during VCP point count surveys.

Breeding species were defined as those species with a relative abundance of ≥ 0.05 individuals per sampling station or those species exhibiting direct evidence of breeding activity (e.g., visible nest, chicks, feeding trips, or adults counter-singing). Given these criteria, 32 species (50%) detected during VCP surveys breed within the park. Five of these breeding species (16%) were detected at $\geq 50\%$ of the sampling stations within the park (Table 8-2). Three forest-dwelling species, Wood Thrush ($\bar{x} = 1.31$, SE = 0.10), Red-bellied Woodpecker ($\bar{x} = 0.92$, SE = 0.09), and Red-eyed Vireo ($\bar{x} = 0.91$, SE = 0.10), were the most abundant species detected (Table 8-2).

Table 8-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Morristown NHP during point count surveys in the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses.

Species	$\bar{x} \pm SE$ (n=110)	Occurrence (% of stations)	Park Status ^a	PIF Priority Species ^b
Canada Goose	-	-	L	-
Red-tailed Hawk	0.02 ± 0.01	2	L	-
Wild Turkey	0.02 ± 0.01	2	L	-
Mourning Dove	0.04 ± 0.02	4	L	-
Chimney Swift	-	-	L	-
Yellow-billed Cuckoo	0.01 ± 0.01	1	L	-
Red-bellied Woodpecker	0.92 ± 0.09	56	B	-
Yellow-bellied Sapsucker	0.02 ± 0.01	2	R	-
Downy Woodpecker	0.15 ± 0.04	14	B	-
Hairy Woodpecker	0.04 ± 0.02	4	L	-
Northern Flicker	0.34 ± 0.06	27	B	-
Pileated Woodpecker	0.05 ± 0.02	5	B	-
Eastern Wood-Pewee	0.55 ± 0.06	48	B	IIA
Eastern Phoebe	0.03 ± 0.02	3	L	-
Great Crested Flycatcher	0.13 ± 0.03	12	B	-
Yellow-throated Vireo	0.10 ± 0.03	9	B	-
Red-eyed Vireo	0.91 ± 0.10	54	B	-
Blue Jay	0.79 ± 0.08	55	B	-
American Crow	0.30 ± 0.08	19	B	-
Purple Martin	-	-	L	-
Black-capped Chickadee	0.04 ± 0.02	3	L	-
Eastern Tufted Titmouse	0.96 ± 0.12	47	B	-
White-breasted Nuthatch	0.13 ± 0.04	11	B	-
Carolina Wren	0.02 ± 0.01	2	L	-
House Wren	0.01 ± 0.01	1	L	-
Blue-gray Gnatcatcher	0.01 ± 0.01	1	L	-
Eastern Bluebird	0.03 ± 0.02	2	L	-
Veery	0.27 ± 0.06	21	B	NJ-SC
Gray-cheeked Thrush	-	-	M	NJ-SC
Swainson's Thrush	0.17 ± 0.10	6	M	-
Hermit Thrush	0.01 ± 0.01	1	L	-
Wood Thrush	1.31 ± 0.10	74	B	I
American Robin	0.50 ± 0.10	27	B	-
Gray Catbird	0.50 ± 0.09	27	B	III
Northern Mockingbird	0.02 ± 0.01	2	L	-
European Starling	0.02 ± 0.02	1	L	-

Table 8-2. Relative abundance ($\bar{x} \pm SE$ per point count station) of birds detected at Morristown NHP during point count surveys in the breeding season in 2002 and 2003, the overall occurrence of birds within the park (% of stations with a detection), species breeding status within the park, and the Partners in Flight ranking for species listed as a conservation priority in the Northern Ridge and Valley Physiographic Area (Rosenberg 2003). Species listed as (-) were encountered during other field surveys or between point count stations, and thus did not meet the requirements to be included in point count analyses (continued).

Cedar Waxwing	2.15 ± 0.75	15	B	-
Tennessee Warbler	-	-	M	-
Yellow Warbler	0.01 ± 0.01	1	L	-
Chestnut-sided Warbler	0.01 ± 0.01	1	L	-
Magnolia Warbler	0.01 ± 0.01	1	M	-
Black-throated Blue Warbler	0.02 ± 0.01	2	M	I
Yellow-rumped Warbler	0.06 ± 0.04	3	M	-
Black-throated Green Warbler	0.01 ± 0.01	1	M	NJ-SC
Blackpoll Warbler	0.12 ± 0.04	10	M	-
Cerulean Warbler	0.01 ± 0.01	1	L	I, NJ-SC
Black-and-White Warbler	0.12 ± 0.04	10	B	-
American Redstart	0.19 ± 0.05	15	B	-
Worm-eating Warbler	0.05 ± 0.02	5	B	I
Ovenbird	0.80 ± 0.09	50	B	-
Louisiana Waterthrush	0.09 ± 0.04	6	B	I
Kentucky Warbler	0.01 ± 0.01	1	L	I, NJ-SC
Common Yellowthroat	0.02 ± 0.01	2	L	-
Hooded Warbler	0.03 ± 0.02	3	L	-
Canada Warbler	-	-	L	IIC, NJ-SC
Scarlet Tanager	0.44 ± 0.07	29	B	IIB
Eastern Towhee	0.38 ± 0.07	28	B	IIA
Chipping Sparrow	0.09 ± 0.03	9	B	-
Field Sparrow	0.01 ± 0.01	1	L	I
Song Sparrow	0.05 ± 0.02	4	B	-
White-throated Sparrow	-	-	M	-
Northern Cardinal	0.26 ± 0.06	18	B	-
Rose-breasted Grosbeak	0.09 ± 0.03	8	B	-
Indigo Bunting	0.09 ± 0.03	9	B	-
Red-winged Blackbird	0.01 ± 0.01	1	L	-
Common Grackle	0.02 ± 0.01	2	L	-
Brown-headed Cowbird	0.32 ± 0.11	17	B	-
Baltimore Oriole	0.32 ± 0.07	24	B	IIA
House Finch	0.05 ± 0.03	3	B	-
Red Crossbill	-	-	M	-
American Goldfinch	0.01 ± 0.01	1	L	-
House Sparrow	0.01 ± 0.01	1	L	-

^a **Park Status:** B – breeding species, mean of ≥ 0.05 individuals detected per sampling station or direct evidence of breeding within the park;

L – local breeder, mean of < 0.05 individuals detected per station, status within park unknown, R – local resident outside of the breeding season, M - migrant

^b **PIF Priority Species Designations:** I - High Continental Priority; IIA - High Regional Concern; IIB – High Regional Responsibility; IIC – High Regional Threats; III – U.S. National Watch List; F – Federally Listed; NJ – Listed in the State of New Jersey; E- Endangered, T- Threatened, SC – Species of Concern

Of species breeding in the park, Partners In Flight lists seven as conservation priorities for the Northern Ridge and Valley Physiographic Area (Area 17; http://www.blm.gov/wildlife/pl_17sum.htm). Wood Thrush, Worm-Eating Warbler, and Louisiana Waterthrush are listed as high continental priorities for conservation efforts, while Eastern Wood-Pewee, Scarlet Tanager, Eastern Towhee, and Baltimore Oriole are all listed as species of high regional priority.

With the exception of Eastern Towhee, all of these species are neotropical migrants associated with deciduous and mixed forest communities (DeGraaf and Rappole 1995). Specifically, Wood Thrushes commonly occur in forested wetlands, while Worm-eating Warblers are generally associated with dense underbrush and steep ravines (DeGraaf and Rappole 1995). Eastern Towhees rely on dense brush and early successional edge habitat, and both breed and winter throughout the eastern United States (DeGraff and Rappole 1995). PIF also lists Gray Catbird as a U.S. National Watch List species.

One species that breeds in the park, Veery, is listed in the State of New Jersey as a species of special concern (<http://www.state.nj.us/dep/fgw/ensphome.htm>). Like Wood Thrushes, Veerys prefer moist deciduous forest conditions (DeGraaf and Rappole 1995).

Although not detected with a high enough frequency to meet the breeding species criteria used in this survey, several other species of conservation interest may breed in the park based on their current distributions and known habitat requirements (National Geographic 1999). A Cerulean Warbler (station 50, deciduous forest) and a Kentucky Warbler (station 93, deciduous forest) were each detected on a single occasion during point count surveys. Both species are listed by PIF as high continental conservation priorities and are listed by the State of New Jersey as species of special concern.

Field Sparrows are also listed by PIF as a high continental conservation priority. A single Field Sparrow was detected at MORR (station 62, deciduous forest) outside of the early successional habitat it generally relies on. Although Field Sparrows may utilize patches of early successional habitat within the park, it is unlikely that they would ever become common in this primarily forested setting. A single Canada Warbler, listed by PIF as a species experiencing high regional threats and by the State of New Jersey as a species of special concern, was detected during a field visit to the park in late May of 2002. This individual was probably a migrant passing through the park on its way to northern breeding grounds.

Although point count surveys focus on detecting breeding species, during the course of our field work several interesting migratory species were also detected in the park. We detected a single Gray-cheeked Thrush and a single Black-throated Green Warbler, both listed as species of special concern in the State of New Jersey, migrating through to breeding grounds farther to the north. We also recorded two observations of migrating Black-throated Blue Warblers, listed by PIF as a continental conservation priority.

Of the 64 species detected during VCP surveys, 61 (95%) were detected at deciduous forested stations (N=90), 24 (38%) at forested wetland stations (N=7), 30 (47%) at early successional / edge stations (N=7), 29 (45%) at forested stations adjacent to streams (N=5), and 7 species (11%) at the single station located in conifer forest. Although the number of sampling stations (and therefore survey effort) varied by habitat type, it is interesting to note the high number of species (N=30) detected at stations located in early successional habitat, given that this habitat type represents only 6% of the stations surveyed. A single House Wren, two Northern Mockingbirds, and a single Chestnut-sided Warbler were all detected only in early successional habitat (Table 8-3).

Table 8-3. Habitat associations of bird species detected during VCP point count surveys.

Species	Deciduous Forest (N=90)	Forested Wetland (N=7)	Early Successional Edge (N=7)	Forest Stream (N=5)	Conifer Forest (N=1)
Red-tailed Hawk	X	-	-	-	-
Wild Turkey	X	-	X	X	-
Mourning Dove	X	-	X	-	-
Yellow-billed Cuckoo	X	-	-	-	-
Chimney Swift	X	-	-	-	-
Red-bellied Woodpecker	X	X	X	X	X
Yellow-bellied Sapsucker	X	-	-	-	-
Downy Woodpecker	X	-	X	-	-
Hairy Woodpecker	X	-	-	X	-
Northern Flicker	X	X	-	X	-
Pileated Woodpecker	X	-	X	-	-
Eastern Wood-Pewee	X	X	X	X	-
Eastern Phoebe	X	-	X	X	-
Great Crested Flycatcher	X	-	X	X	-
Yellow-throated Vireo	X	-	X	-	-
Red-eyed Vireo	X	X	X	X	-
Blue Jay	X	X	X	X	-
American Crow	X	X	-	X	X
Black-capped Chickadee	X	X	X	-	-
Tufted Titmouse	X	X	X	X	X
White-breasted Nuthatch	X	-	X	X	-
Carolina Wren	X	X	-	-	-
House Wren	-	-	X	-	-
Blue-gray Gnatcatcher	X	-	-	-	-
Eastern Bluebird	X	-	-	-	-
Veery	X	X	-	X	-
Gray-cheeked Thrush	X	-	-	-	-
Swainson's Thrush	X	X	-	X	-
Hermit Thrush	X	-	-	-	-
Wood Thrush	X	X	X	X	X
American Robin	X	X	X	X	-
Gray Catbird	X	X	X	X	-
Northern Mockingbird	-	-	X	-	-
European Starling	X	-	-	-	-
Cedar Waxwing	X	X	X	X	-
Tennessee Warbler	X	-	-	-	-
Yellow Warbler	X	-	-	-	-
Chestnut-sided Warbler	-	-	X	-	-
Magnolia Warbler	X	-	-	-	-
Black-throated Blue Warbler	X	-	-	-	-
Yellow-rumped Warbler	X	-	X	-	-
Black-throated Green Warbler	X	-	-	-	-
Blackpoll Warbler	X	-	-	X	-

Table 8-3. Habitat associations of bird species detected during VCP point count surveys (continued).

Species	Deciduous Forest (N=90)	Forested Wetland (N=7)	Early Successional Edge (N=7)	Forest Stream (N=5)	Conifer Forest (N=1)
Cerulean Warbler	X	-	-	-	-
Black-and-White Warbler	X	-	-	-	-
American Redstart	X	X	-	-	-
Worm-eating Warbler	X	-	-	-	-
Ovenbird	X	X	-	X	X
Louisiana Waterthrush	X	X	-	X	-
Kentucky Warbler	X	-	-	-	-
Common Yellowthroat	X	-	-	-	-
Hooded Warbler	X	-	-	-	-
Eastern Towhee	X	X	X	X	X
Chipping Sparrow	X	X	X	X	-
Field Sparrow	X	-	-	-	-
Song Sparrow	X	-	X	X	-
White-throated Sparrow	X	-	-	-	-
Northern Cardinal	X	X	X	-	X
Rose-breasted Grosbeak	X	-	X	X	-
Indigo Bunting	X	-	X	-	-
Red-winged Blackbird	X	-	-	X	-
Common Grackle	X	-	-	X	-
Brown-headed Cowbird	X	X	X	X	-
Orchard Oriole	X	-	-	-	-
Baltimore Oriole	X	X	X	X	-
House Finch	X	X	-	-	-
American Goldfinch	X	-	-	-	-
House Sparrow	X	-	-	-	-

The distribution of individuals and species in MORR varied between stations, but no clear patterns were evident. Figure 8-2 shows the mean number of individuals detected at each sampling station, while Figure 8-3 shows the total number of species detected at each sampling station. The relative abundance of each species at each sampling station can be found in Appendix 8-A.

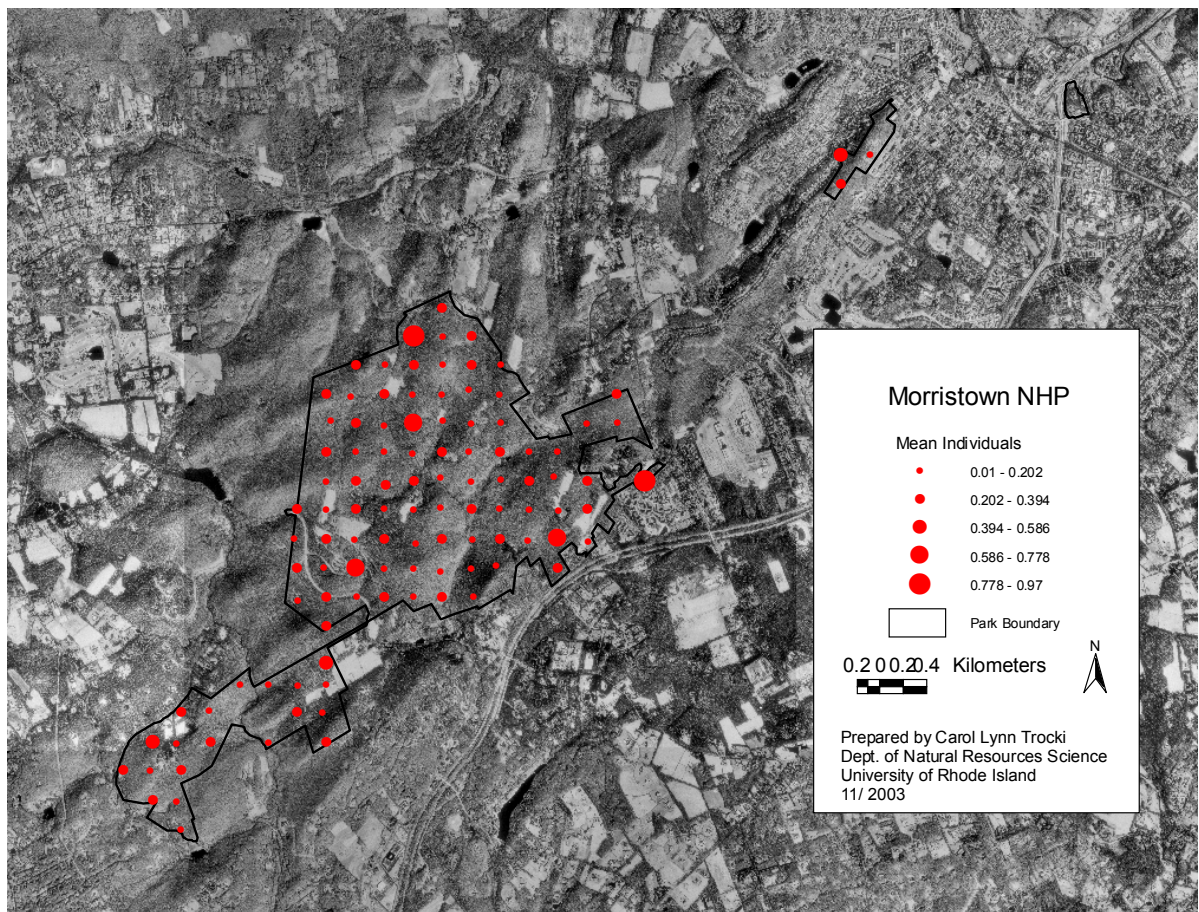


Figure 8-2. The mean number of individuals (all species combined) detected at each sampling station in Morrystown NHP during VCP surveys in 2002 and 2003.

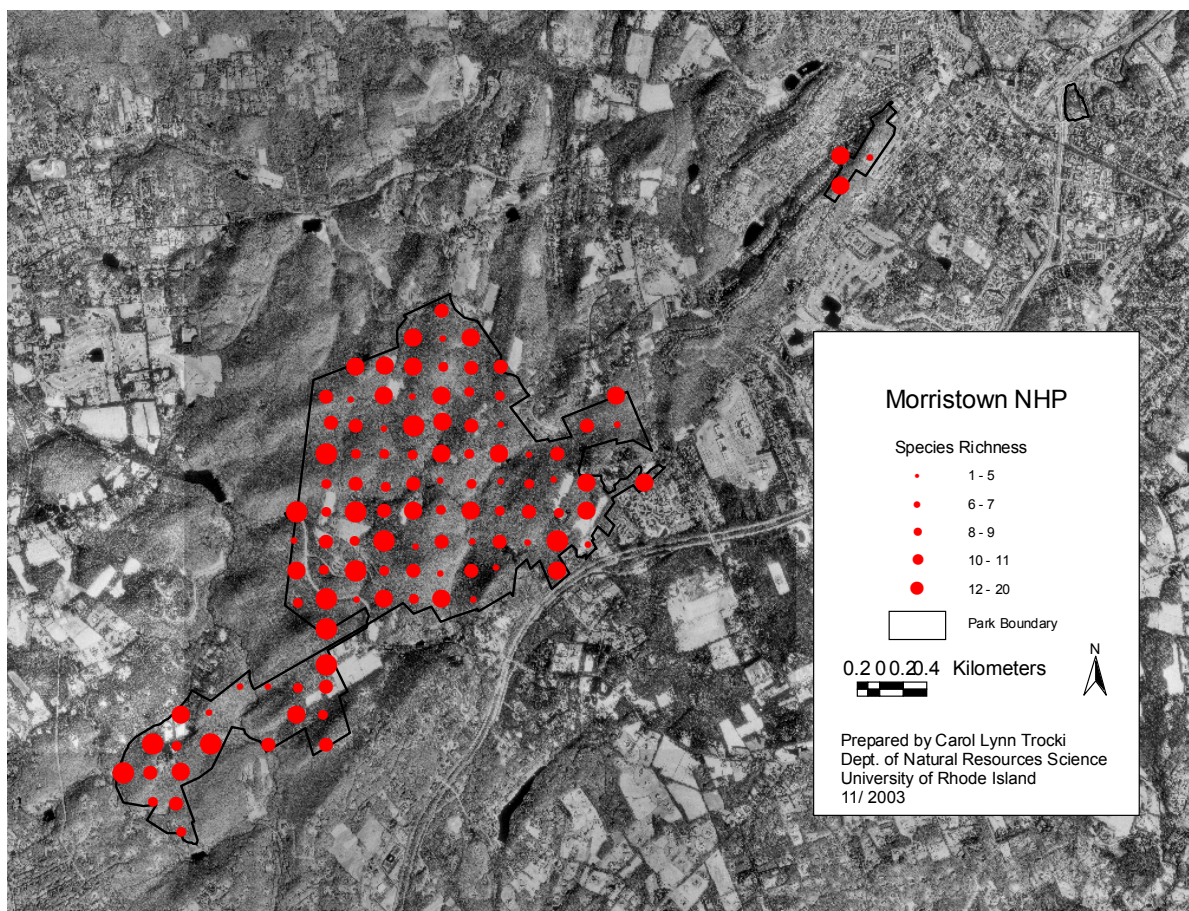


Figure 8-3. The total number of species detected at each sampling station in Morrissett NHP during VCP surveys in 2002 and 2003.

Chapter 9

Avian surveys in Northeast Temperate Network Parks:

Summary

We detected 178 species during our initial inventory of seven parks in the Northeast Temperate Network. Birds detected during these point count surveys were from a wide variety of taxa (Table 9-1) and migratory strategies (Figure 9-1). Overall, passerines (songbirds) that migrate to the Neotropics (Central America, the Caribbean, and South America) accounted for more species (35% of all species) than any other taxa. This suggests that these parks, which were primarily established as historical landmarks, are also important for biological resources. Analyses from Breeding Bird Surveys indicate that at least 26 species of Neotropical migrants are declining in the region, 13 of which show significant negative trends (Sauer et al 2003). All 26 species were detected in parks in the Northeast Temperate Network (Table 9-2), indicating that park habitats are providing critical nesting, foraging, and migratory stopover habitat.

Table 9-1. Taxa detected (% of total bird species at each park) at seven National Parks in the Northeast Temperate Network during point count surveys in 2002 and 2003. Categories included waterbirds (loons, cormorants, wading birds), waterfowl, shorebirds (including gulls and terns), raptors (diurnal and nocturnal), non-passerines (rails, doves, hummingbirds, swifts, cuckoos, woodpeckers), and passerines (subdivided into migration strategies).

Taxa	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR	Network
Waterbirds	11.1	3.2	5.4	0.0	6.2	1.4	0.0	4.8
Waterfowl	8.1	3.2	5.4	3.1	11.1	4.1	1.4	5.7
Shorebirds	18.5	1.6	5.4	0.0	3.7	2.7	0.0	6.3
Raptors	6.7	4.8	0.0	7.7	4.9	1.4	1.4	4.4
Non-passerines	5.9	8.1	16.2	15.4	12.3	12.3	12.5	10.9
Passerine-Residents	8.1	16.1	24.3	15.4	12.3	9.6	13.9	12.8
Passerine-Nearctic	15.6	22.6	18.9	24.6	16.0	24.7	23.6	20.2
Passerine-Neotropical	25.9	40.3	24.3	33.8	33.3	43.8	47.2	35.0

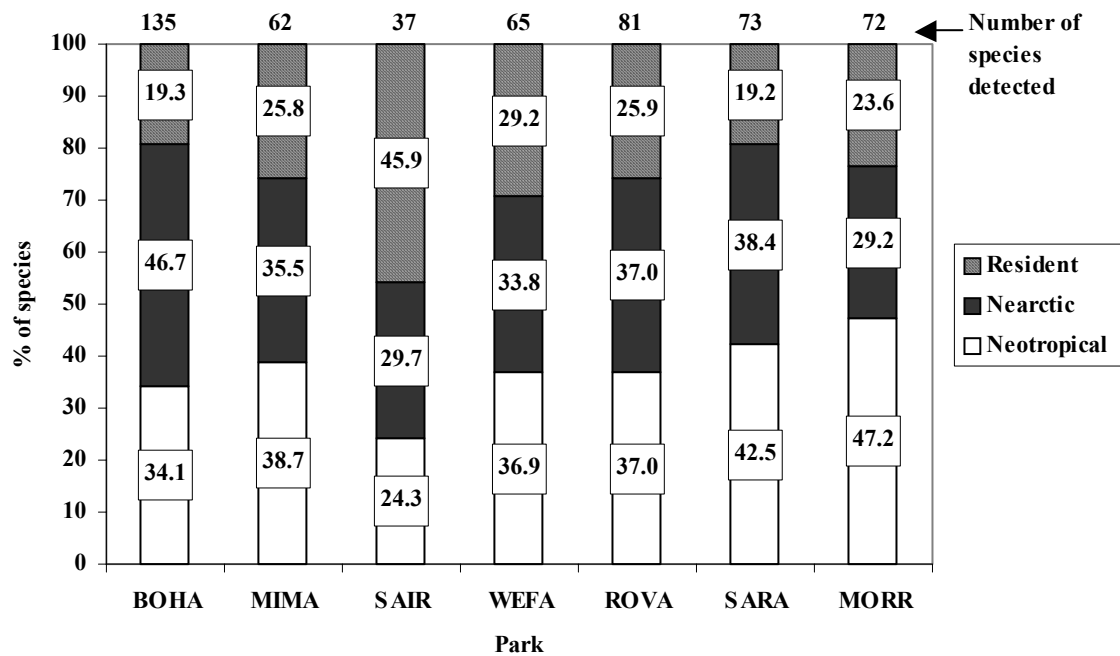


Figure 9-1. Migration strategies of birds detected during avian surveys in seven National Parks of the Northeast Temperate Network during 2002 and 2003.

Table 9-2. Population trends (based on Breeding Bird Surveys 1980-2002, Southern New England Region; Sauer et al 2003) for selected Neotropical migrants detected during point counts in parks in the Northeast Temperate Network. *Trend was significant.

Species	Rate of decline	Parks where species was detected
Yellow-billed Cuckoo	-12.7*	ROVA, MORR
Baltimore Oriole	-5.4*	BOHA, MIMA, SAIR, WEFA, ROVA, SARA, MORR
Prairie Warbler	-5.0*	BOHA, SARA
Rose-breasted Grosbeak	-4.9*	MIMA, SAIR, ROVA, SARA, MORR
Least Flycatcher	-4.2*	WEFA
Eastern Kingbird	-3.9*	BOHA, MIMA, WEFA, ROVA, SARA
Blue-winged Warbler	-3.8*	MIMA
Indigo Bunting	-2.2*	BOHA, MIMA, SAIR, ROVA, SARA, MORR
Common Yellowthroat	-2.0*	BOHA, MIMA, SAIR, ROVA, SARA, MORR
House Wren	-2.0*	BOHA, MIMA, WEFA, ROVA, SARA, MORR
Bobolink	-1.7*	BOHA, MIMA, SARA
Wood Thrush	-1.4*	BOHA, MIMA, WEFA, ROVA, SARA, MORR
Ovenbird	-1.3*	MIMA, SAIR, WEFA, ROVA, SARA, MORR
Yellow-throated Vireo	-2.0	WEFA, ROVA, SARA, MORR
Louisiana Waterthrush	-1.7	WEFA, ROVA, SARA, MORR
Broad-winged Hawk	-1.7	MIMA, WEFA, ROVA
Canada Warbler	-1.6	BOHA, MORR
Barn Swallow	-1.4	BOHA, MIMA, SAIR, ROVA, SARA
Eastern Wood-Pewee	-1.1	BOHA, MIMA, WEFA, ROVA, SARA, MORR
Great Crested Flycatcher	-1.1	BOHA, MIMA, WEFA, ROVA, SARA, MORR
Black-and-White Warbler	-1.1	BOHA, MIMA, WEFA, ROVA, SARA, MORR
Scarlet Tanager	-1.1	MIMA, WEFA, ROVA, SARA, MORR
Red-eyed Vireo	-0.9	BOHA, MIMA, WEFA, ROVA, SARA, MORR
Chimney Swift	-0.7	BOHA, MIMA, WEFA, ROVA, SAIR, MORR
Orchard Oriole	-0.6	BOHA
Veery	-0.4	WEFA, ROVA, SARA, MORR

Due to the variety of terrestrial and aquatic habitats available in Boston Harbor, more species (135 total) were detected in BOHA than any other park in the network (Table 9-1). The high species richness found in BOHA was primarily because of the large number of species associated with aquatic habitats surrounding the islands (i.e., waterbirds, waterfowl, and shorebirds). Not unexpectedly, SAIR, which is a relatively small park located in a residential neighborhood, had many fewer species than the other parks. Species present in SAIR tended to be resident passerines typical of urbanized landscapes, although several species of Neotropical migrants were also present in the park (Figure 9-1).

Because many species of Neotropical migrants are forest specialists, the larger forested parks (MORR and SARA) had a higher percentage of Neotropical migrants detected within their boundaries (See Table 9-2, Figure 9-1). In addition, two declining Nearctic migrants which are both forest specialists (Brown Creeper, BBS trend = -8.4% annual decline, and Purple Finch, BBS Trend = -6.9% annual decline), were detected in some parks in the region (Table 9-2).

We summarized the relative abundance and occurrence of birds at each of the seven parks (Table 9-3, Table 9-4). These tables give resource managers and other readers a sense of the spatial distribution and abundance of breeding birds in the northeastern United States. Looking through these tables, it is clear that BOHA was the only park with large numbers of waterbirds (e.g., loons, wading birds) and waterfowl, although quite a few species of waterfowl used the Hudson River adjacent to ROVA. Diurnal and nocturnal raptors were detected in all parks, with the exception of SAIR, although no large concentrations were detected in any park, which is typical for this guild. Only during fall migration along the coast or within migratory flyways would large numbers of hawks be detected, and our surveys primarily took place during the breeding season.

Table 9-3. Relative abundance (mean number of individuals per point count station) of 179 species of birds detected in seven National Parks in the Northeastern Temperate Network in 2002 and 2003. T=trace, detected at <0.01 individuals per station, or outside of VCP surveys.

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR
Red-throated Loon	0.01	-	-	-	-	-	-
Common Loon	T	-	-	-	-	-	-
Wilson's Storm-Petrel	T	-	-	-	-	-	-
Double-crested Cormorant	0.06	-	-	-	T	-	-
Northern Gannet	T	-	-	-	-	-	-
Great Blue Heron	0.01	T	T	-	T	T	-
Great Egret	0.01	-	-	-	T	-	-
Snowy Egret	0.04	-	-	-	-	-	-
Little Blue Heron	T	-	-	-	-	-	-
Green Heron	0.03	T	-	-	0.01	-	-
Tricolored Heron	T	-	-	-	-	-	-
Black-crowned Night-Heron	0.06	-	T	-	0.01	-	-
Glossy Ibis	T	-	-	-	-	-	-
Mute Swan	0.01	-	-	-	T	-	-
Canada Goose	0.17	T	0.33	0.05	0.01	0.01	T
Brant	T	-	-	-	-	-	-
Wood Duck	-	-	-	T	T	0.07	-
Mallard	0.07	0.01	0.06	-	0.04	0.01	-
American Black Duck	0.17	-	-	-	T	-	-
Canvasback	-	-	-	-	T	-	-
Ring-necked Duck	-	-	-	-	T	-	-
Black Scoter	T	-	-	-	-	-	-
White-winged Scoter	T	-	-	-	-	-	-
Long-tailed Duck	T	-	-	-	-	-	-
Common Eider	0.03	-	-	-	-	-	-
Bufflehead	T	-	-	-	-	-	-
Hooded Merganser	-	-	-	-	T	-	-
Common Merganser	-	-	-	-	T	-	-
Red-breasted Merganser	T	-	-	-	-	-	-
Turkey Vulture	T	-	-	-	-	-	-
Sharp-shinned Hawk	T	-	-	T	-	-	-
Cooper's Hawk	T	-	-	-	-	-	-
Red-shouldered Hawk	-	-	-	0.03	-	-	-
Broad-winged Hawk	-	0.01	-	0.02	T	-	-
Red-tailed Hawk	T	0.02	-	0.05	0.01	-	0.02
Bald Eagle	-	-	-	-	T	-	-
Osprey	T	-	-	-	T	-	-
American Kestrel	T	T	-	-	-	0.01	-
Peregrine Falcon	T	-	-	-	-	-	-
Northern Bobwhite	0.01	-	-	-	-	-	-
Ring-necked Pheasant	0.02	-	-	-	-	-	-
Wild Turkey	-	-	-	0.05	0.04	-	0.02
Virginia Rail	-	-	-	-	T	-	-
Black-bellied Plover	T	-	-	-	-	-	-

Table 9-3. Relative abundance (mean number of individuals per point count station) of 179 species of birds detected in seven National Parks in the Northeastern Temperate Network in 2002 and 2003. T=trace, detected at <0.01 individuals per station, or outside of VCP surveys (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR
Semipalmated Plover	T	-	-	-	-	-	-
Killdeer	0.01	0.09	-	-	-	0.01	-
American Oystercatcher	0.11	-	-	-	-	-	-
Greater Yellowlegs	0.01	-	-	-	-	-	-
Lesser Yellowlegs	T	-	-	-	-	-	-
Willet	0.01	-	-	-	-	-	-
Spotted Sandpiper	0.05	-	-	-	T	T	-
Whimbrel	T	-	-	-	-	-	-
Ruddy Turnstone	T	-	-	-	-	-	-
Purple Sandpiper	T	-	-	-	-	-	-
Sanderling	T	-	-	-	-	-	-
Western Sandpiper	T	-	-	-	-	-	-
White-rumped Sandpiper	T	-	-	-	-	-	-
Semipalmated Sandpiper	T	-	-	-	-	-	-
Dowitcher species	T	-	-	-	-	-	-
American Woodcock	T	-	-	-	-	-	-
Bonaparte's Gull	T	-	-	-	-	-	-
Laughing Gull	T	-	-	-	-	-	-
Ring-billed Gull	T	-	-	-	0.01	-	-
Herring Gull	1.15	-	T	-	-	-	-
Great Black-backed Gull	1.96	-	T	-	T	-	-
Roseate Tern	T	-	-	-	-	-	-
Common Tern	0.02	-	-	-	-	-	-
Least Tern	0.01	-	-	-	-	-	-
Black Guillemot	T	-	-	-	-	-	-
Razorbill	T	-	-	-	-	-	-
Rock Dove	0.03	0.05	0.11	-	T	0.01	-
Mourning Dove	0.18	0.24	0.22	0.1	0.26	0.22	0.04
Yellow-billed Cuckoo	-	-	-	T	0.01	-	0.01
Barn Owl	T	-	-	0.02	-	-	-
Great Horned Owl	0.01	-	-	-	-	-	-
Chimney Swift	0.01	0.04	0.11	T	0.02	-	T
Ruby-throated Hummingbird	-	-	-	T	-	0.01	-
Belted Kingfisher	0.01	-	T	0.02	-	0.01	-
Red-bellied Woodpecker	T	0.03	T	0.48	0.46	-	0.92
Yellow-bellied Sapsucker	-	-	-	-	-	0.01	0.02
Downy Woodpecker	0.06	0.1	0.06	0.4	0.05	0.06	0.15
Hairy Woodpecker	-	-	-	0.13	0.13	0.02	0.04
Pileated Woodpecker	-	-	-	0.05	0.06	0.04	0.05
Northern Flicker	0.04	0.06	0.06	0.02	0.12	0.07	0.34
Eastern Wood-Pewee	0.01	0.06	-	0.2	0.35	0.24	0.55
Alder Flycatcher	-	0.03	-	-	-	0.05	-
Least Flycatcher	-	-	-	0.08	-	-	-
Yellow-bellied Flycatcher	-	-	-	-	-	0.01	-

Table 9-3. Relative abundance (mean number of individuals per point count station) of 179 species of birds detected in seven National Parks in the Northeastern Temperate Network in 2002 and 2003. T=trace, detected at <0.01 individuals per station, or outside of VCP surveys (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR
Willow Flycatcher	0.07	-	-	-	0.01	-	-
Eastern Phoebe	0.01	0.16	0.33	0.08	0.06	0.04	0.03
Great Crested Flycatcher	0.01	0.01	-	0.28	0.49	0.13	0.13
Eastern Kingbird	0.03	0.08	-	0.02	0.05	0.11	-
Red-eyed Vireo	0.03	0.12	-	0.53	0.7	0.3	0.91
Warbling Vireo	0.03	0.03	-	-	0.06	0.01	-
White-eyed Vireo	-	-	-	0.03	-	-	-
Yellow-throated Vireo	-	-	-	0.02	0.01	0.02	0.1
Blue-headed Vireo	-	-	-	0.02	-	0.01	-
Blue Jay	0.07	0.53	0.17	0.73	0.29	0.42	0.79
American Crow	0.24	0.3	1.67	0.82	0.59	0.43	0.3
Fish Crow	T	-	-	-	-	-	-
North. Rough-winged Swallow	0.04	-	-	-	-	-	-
Cliff Swallow	T	-	-	-	-	-	-
Tree Swallow	0.03	T	-	-	0.01	0.14	-
Purple Martin	-	-	-	-	-	-	T
Barn Swallow	0.14	T	T	-	0.02	T	-
Tufted Titmouse	0.06	0.51	0.11	2.08	0.73	0.07	0.96
Black-capped Chickadee	0.19	0.51	0.11	0.98	0.39	0.39	0.04
Red-breasted Nuthatch	T	-	-	-	-	0.01	-
White-breasted Nuthatch	0.03	0.34	0.11	0.57	0.11	0.06	0.13
Brown Creeper	T	-	-	0.07	-	-	-
Carolina Wren	0.16	0.01	-	0.02	0.04	-	0.02
House Wren	0.02	0.07	-	0.12	0.06	0.08	0.01
Ruby-crowned Kinglet	T	-	-	-	-	-	-
Blue-gray Gnatcatcher	-	0.02	-	-	0.01	-	0.01
Eastern Bluebird	-	0.01	-	0.33	0.01	0.01	0.03
American Robin	0.33	0.81	1.17	0.35	0.3	0.56	0.5
Wood Thrush	T	0.2	-	0.17	0.35	0.18	1.31
Veery	-	-	-	T	0.1	0.1	0.27
Swainson's Thrush	T	-	-	-	-	0.01	0.17
Gray-cheeked Thrush	-	-	-	-	-	-	T
Hermit Thrush	-	-	-	-	-	0.17	0.01
Gray Catbird	0.75	0.47	1.17	0.08	0.33	0.23	0.5
Northern Mockingbird	0.07	0.1	0.22	0.08	0.04	-	0.02
Brown Thrasher	0.01	-	-	-	-	-	-
European Starling	0.63	0.2	3.89	0.08	0.17	0.16	0.02
Cedar Waxwing	0.16	0.1	-	0.17	0.45	0.21	2.15
Nashville Warbler	T	-	-	-	-	-	-
Northern Parula	0.01	-	-	-	T	-	-
Tennessee Warbler	-	-	-	-	-	-	T
Blue-winged Warbler	-	0.06	-	-	-	-	-
Nashville Warbler	-	-	-	-	-	0.01	-
Yellow Warbler	0.77	0.41	0.33	-	0.05	0.27	0.01

Table 9-3. Relative abundance (mean number of individuals per point count station) of 179 species of birds detected in seven National Parks in the Northeastern Temperate Network in 2002 and 2003. T=trace, detected at <0.01 individuals per station, or outside of VCP surveys (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR
Chestnut-sided Warbler	T	-	-	-	-	0.01	0.01
Magnolia Warbler	0.01	0.01	-	0.03	-	-	0.01
Cape May Warbler	T	-	-	-	-	-	-
Black-throated Blue Warbler	T	-	-	0.02	-	-	0.02
Cerulean Warbler	-	-	-	-	-	-	0.01
Yellow-rumped Warbler	T	-	-	-	-	-	0.06
Black-throated Green Warbler	T	-	-	-	T	-	0.01
Prairie Warbler	T	-	-	-	-	0.07	-
Blackpoll Warbler	0.01	-	-	-	-	-	0.12
Pine Warbler	0.01	0.19	-	0.03	-	0.01	-
Worm-eating Warbler	0.01	-	-	-	0.16	-	0.05
Black-and-White Warbler	T	0.04	-	0.08	0.02	0.15	0.12
American Redstart	0.07	0.04	-	-	0.06	0.01	0.19
Ovenbird	-	0.09	T	0.92	0.06	0.37	0.8
Northern Waterthrush	T	-	-	0.02	-	-	-
Louisiana Waterthrush	-	-	-	0.1	0.1	0.02	0.09
Kentucky Warbler	-	-	-	-	-	-	0.01
Common Yellowthroat	0.33	0.41	0.39	-	0.12	0.68	0.02
Canada Warbler	T	-	-	-	-	-	T
Wilson's Warbler	-	-	-	0.02	-	-	-
Hooded Warbler	-	-	-	-	-	-	0.03
Scarlet Tanager	-	0.08	-	0.18	0.29	0.02	0.44
Northern Cardinal	0.26	0.47	0.72	0.72	0.66	0.19	0.26
Rose-breasted Grosbeak	-	0.06	0.06	-	0.07	0.07	0.09
Indigo Bunting	0.01	0.03	0.06	-	0.15	0.07	0.09
Eastern Towhee	-	0.05	-	0.02	0.01	0.16	0.38
Chipping Sparrow	0.01	0.16	-	0.72	0.34	0.11	0.09
Field Sparrow	-	-	-	0.02	-	0.32	0.01
Savannah Sparrow	0.01	-	-	T	-	0.01	-
Song Sparrow	1.56	0.66	1.11	0.27	0.13	0.96	0.05
Swamp Sparrow	T	0.04	-	-	-	0.01	-
White-throated Sparrow	T	-	-	-	-	-	T
Dark-eyed Junco	T	-	-	-	-	-	-
Eastern Meadowlark	-	-	-	-	-	0.28	-
Bobolink	0.12	0.01	-	-	-	0.45	-
Brown-headed Cowbird	0.06	0.09	-	0.02	0.16	0.07	0.32
Orchard Oriole	0.03	-	-	-	-	-	-
Red-winged Blackbird	1.28	0.77	2.89	T	0.29	0.75	0.01
Common Grackle	0.49	0.07	0.33	0.03	0.35	0.02	0.02
Baltimore Oriole	0.06	0.2	0.22	0.02	0.27	0.03	0.32
Purple Finch	T	-	-	-	-	0.01	-
House Finch	0.07	0.16	0.06	0.37	0.04	-	0.05
Red Crossbill	-	-	-	-	-	-	T
American Goldfinch	0.3	0.35	0.06	0.47	0.51	0.49	0.01
House Sparrow	0.14	0.35	9.11	0.37	0.05	-	0.01

Table 9-4. Occurrence of birds at point count stations (% of stations with a detection) for 179 species of birds at seven National Park in the Northeast Temperate Network. Point counts were conducted in 2002 and 2003. T = trace, <1% or detected with other survey methods.

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR	% of Parks
Red-throated Loon	1	-	-	-	-	-	-	14.3
Common Loon	T	-	-	-	-	-	-	14.3
Wilson's Storm-Petrel	T	-	-	-	-	-	-	14.3
Double-crested Cormorant	12	-	-	-	T	-	-	28.6
Northern Gannet	T	-	-	-	-	-	-	14.3
Great Blue Heron	2	T	T	-	T	T	-	71.4
Great Egret	4	-	-	-	T	-	-	28.6
Snowy Egret	7	-	-	-	-	-	-	14.3
Little Blue Heron	T	-	-	-	-	-	-	14.3
Green Heron	1	T	-	-	2	-	-	42.9
Tricolored Heron	T	-	-	-	-	-	-	14.3
Black-crowned Night-Heron	9	-	T	-	2	-	-	42.9
Glossy Ibis	T	-	-	-	-	-	-	14.3
Mute Swan	1	-	-	-	T	-	-	28.6
Canada Goose	4	T	33	17	2	1	T	100.0
Brant	T	-	-	-	-	-	-	14.3
Wood Duck	-	-	-	T	T	1	-	42.9
Mallard	9	2	33	-	5	1	-	71.4
American Black Duck	-	-	-	-	T	-	-	14.3
Canvasback	-	-	-	-	T	-	-	14.3
Ring-necked Duck	-	-	-	-	T	-	-	14.3
American Black Duck	12	-	-	-	-	-	-	14.3
Black Scoter	T	-	-	-	-	-	-	14.3
White-winged Scoter	T	-	-	-	-	-	-	14.3
Oldsquaw	T	-	-	-	-	-	-	14.3
Common Eider	1	-	-	-	-	-	-	14.3
Bufflehead	T	-	-	-	-	-	-	14.3
Hooded Merganser	-	-	-	-	T	-	-	14.3
Common Merganser	-	-	-	-	T	-	-	14.3
Red-breasted Merganser	T	-	-	-	-	-	-	14.3
Turkey Vulture	T	-	-	-	-	-	-	14.3
Sharp-shinned Hawk	T	-	-	T	-	-	-	28.6
Cooper's Hawk	T	-	-	-	-	-	-	14.3
Red-shouldered Hawk	-	-	-	33	-	-	-	14.3
Broad-winged Hawk	-	2	-	17	T	-	-	42.9
Red-tailed Hawk	T	3	-	17	2	-	2	71.4
Bald Eagle	-	-	-	-	T	-	-	14.3
Osprey	T	-	-	-	T	-	-	28.6
American Kestrel	T	T	-	-	-	1	-	42.9
Peregrine Falcon	T	-	-	-	-	-	-	14.3
Northern Bobwhite	1	-	-	-	-	-	-	14.3
Ring-necked Pheasant	4	-	-	-	-	-	-	14.3
Wild Turkey	-	-	-	50	2	-	2	42.9
Virginia Rail	-	-	-	-	T	-	-	14.3

Table 9-4. Occurrence of birds at point count stations (% of stations with a detection) for 179 species of birds at seven National Park in the Northeast Temperate Network. Point counts were conducted in 2002 and 2003. T = trace, <1% or detected with other survey methods (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR	% of Parks
Black-bellied Plover	T	-	-	-	-	-	-	14.3
Semipalmated Plover	T	-	-	-	-	-	-	14.3
Killdeer	4	5	-	-	-	1	-	42.9
American Oystercatcher	11	-	-	-	-	-	-	14.3
Greater Yellowlegs	1	-	-	-	-	-	-	14.3
Lesser Yellowlegs	T	-	-	-	-	-	-	14.3
Willet	1	-	-	-	-	-	-	14.3
Spotted Sandpiper	5	-	-	-	T	T	-	42.9
Whimbrel	T	-	-	-	-	-	-	14.3
Ruddy Turnstone	T	-	-	-	-	-	-	14.3
Purple Sandpiper	T	-	-	-	-	-	-	14.3
Sanderling	T	-	-	-	-	-	-	14.3
Western Sandpiper	T	-	-	-	-	-	-	14.3
White-rumped Sandpiper	T	-	-	-	-	-	-	14.3
Semipalmated Sandpiper	T	-	-	-	-	-	-	14.3
Dowitcher species	T	-	-	-	-	-	-	14.3
American Woodcock	T	-	-	-	-	-	-	14.3
Bonaparte's Gull	T	-	-	-	-	-	-	14.3
Laughing Gull	T	-	-	-	-	-	-	14.3
Ring-billed Gull	T	-	-	-	2	-	-	28.6
Herring Gull	27	-	T	-	-	-	-	28.6
Great Black-backed Gull	21	-	T	-	T	-	-	42.9
Roseate Tern	T	-	-	-	-	-	-	14.3
Common Tern	5	-	-	-	-	-	-	14.3
Least Tern	2	-	-	-	-	-	-	14.3
Black Guillemot	T	-	-	-	-	-	-	14.3
Razorbill	T	-	-	-	-	-	-	14.3
Rock Dove	4	2	33	-	T	1	-	71.4
Mourning Dove	29	25	67	50	37	20	4	100.0
Yellow-billed Cuckoo	-	-	-	T	2	-	1	42.9
Barn Owl	T	-	-	17	-	-	-	28.6
Great Horned Owl	1	-	-	-	-	-	-	14.3
Chimney Swift	2	3	33	T	2	-	T	85.7
Ruby-throated Hummingbird	-	-	-	T	-	1	-	28.6
Belted Kingfisher	1	-	T	17	-	1	-	57.1
Red-bellied Woodpecker	T	5	T	83	66	-	56	85.7
Yellow-bellied Sapsucker	-	-	-	-	-	1	2	28.6
Downy Woodpecker	11	17	33	100	10	6	14	100.0
Hairy Woodpecker	-	-	-	67	24	2	4	57.1
Pileated Woodpecker	-	-	-	50	12	4	5	57.1
Northern Flicker	11	10	33	17	22	7	27	100.0
Eastern Wood-Pewee	2	10	-	83	54	21	48	85.7
Alder Flycatcher	-	5	-	-	-	5	-	28.6
Least Flycatcher	-	-	-	33	-	-	-	14.3

Table 9-4. Occurrence of birds at point count stations (% of stations with a detection) for 179 species of birds at seven National Park in the Northeast Temperate Network. Point counts were conducted in 2002 and 2003. T = trace, <1% or detected with other survey methods (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR	% of Parks
Yellow-bellied Flycatcher	-	-	-	-	-	1	-	14.3
Willow Flycatcher	12	-	-	-	2	-	-	28.6
Eastern Phoebe	2	25	33	33	12	4	3	100.0
Great Crested Flycatcher	4	2	-	83	66	13	12	85.7
Eastern Kingbird	10	7	-	17	10	9	-	71.4
Red-eyed Vireo	7	20	-	100	80	25	54	85.7
Warbling Vireo	7	7	-	-	10	T	-	57.1
White-eyed Vireo	-	-	-	17	-	1	-	28.6
Yellow-throated Vireo	-	-	-	17	2	2	9	57.1
Blue-headed Vireo	-	-	-	17	-	1	-	28.6
Blue Jay	15	58	67	100	37	37	55	100.0
American Crow	37	36	100	100	51	36	19	100.0
Fish Crow	T	-	-	-	-	-	-	14.3
North. Rough-winged Swallow	6	-	-	-	-	-	-	14.3
Cliff Swallow	T	-	-	-	-	-	-	14.3
Tree Swallow	4	T	-	-	2	4	-	57.1
Purple Martin	-	-	-	-	-	-	T	14.3
Barn Swallow	13	T	T	-	2	T	-	71.4
Tufted Titmouse	7	47	67	100	88	7	47	100.0
Black-capped Chickadee	21	63	67	100	61	25	3	100.0
Red-breasted Nuthatch	T	-	-	-	-	1	-	28.6
White-breasted Nuthatch	9	36	33	100	17	6	11	100.0
Brown Creeper	T	-	-	33	-	-	-	28.6
Carolina Wren	26	2	-	17	7	-	2	71.4
House Wren	5	10	-	50	7	8	1	85.7
Ruby-crowned Kinglet	T	-	-	-	-	-	-	14.3
Blue-gray Gnatcatcher	-	3	-	-	2	-	1	42.9
Eastern Bluebird	-	2	-	50	2	1	2	71.4
American Robin	33	69	100	100	34	36	27	100.0
Wood Thrush	T	24	-	83	46	13	74	85.7
Veery	-	-	-	T	17	7	21	57.1
Swainson's Thrush	T	-	-	-	-	1	6	42.9
Gray-cheeked Thrush	-	-	-	-	-	-	T	14.3
Hermit Thrush	-	-	-	-	-	13	1	28.6
Gray Catbird	60	47	100	33	29	19	27	100.0
Northern Mockingbird	18	12	67	17	7	-	2	85.7
Brown Thrasher	1	-	-	-	-	-	-	14.3
European Starling	28	12	100	33	15	8	1	100.0
Cedar Waxwing	24	10	-	33	10	13	15	85.7
Nashville Warbler	T	-	-	-	-	-	-	14.3
Northern Parula	1	-	-	-	T	-	-	28.6
Tennessee Warbler	-	-	-	-	-	-	T	14.3
Blue-winged Warbler	-	8	-	-	-	-	-	14.3
Nashville Warbler	-	-	-	-	-	1	-	14.3

Table 9-4. Occurrence of birds at point count stations (% of stations with a detection) for 179 species of birds at seven National Park in the Northeast Temperate Network. Point counts were conducted in 2002 and 2003. T = trace, <1% or detected with other survey methods (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR	% of Parks
Yellow Warbler	65	36	100	-	5	21	1	85.7
Chestnut-sided Warbler	T	-	-	-	-	1	1	42.9
Magnolia Warbler	1	2	-	17	-	-	1	57.1
Cape May Warbler	T	-	-	-	-	-	-	14.3
Black-throated Blue Warbler	T	-	-	17	-	-	2	42.9
Cerulean Warbler	-	-	-	-	-	-	1	14.3
Yellow-rumped Warbler	T	-	-	-	-	-	3	28.7
Black-throated Green Warbler	T	-	-	-	T	-	1	42.9
Prairie Warbler	T	-	-	-	-	7	-	28.6
Blackpoll Warbler	2	-	-	-	-	-	10	28.6
Pine Warbler	1	22	-	17	-	1	-	57.1
Worm-eating Warbler	1	-	-	-	22	-	5	42.9
Black-and-White Warbler	T	8	-	83	5	15	10	85.7
American Redstart	13	8	-	-	12	1	15	71.4
Ovenbird	-	14	T	83	10	29	50	85.7
Northern Waterthrush	T	-	-	17	-	-	-	28.6
Louisiana Waterthrush	-	-	-	50	17	1	6	57.1
Kentucky Warbler	-	-	-	-	-	-	1	14.3
Common Yellowthroat	55	54	100	-	15	54	2	85.7
Canada Warbler	T	-	-	-	-	-	T	28.6
Wilson's Warbler	-	-	-	17	-	-	-	14.3
Hooded Warbler	-	-	-	-	-	-	3	14.3
Scarlet Tanager	-	8	-	50	44	2	29	71.4
Northern Cardinal	39	58	100	100	71	16	18	100.0
Rose-breasted Grosbeak	-	10	33	-	15	7	8	71.4
Indigo Bunting	2	7	33	-	22	6	9	85.7
Eastern Towhee	-	5	-	17	2	13	28	71.4
Chipping Sparrow	1	27	-	33	32	8	9	85.7
Field Sparrow	-	-	-	17	-	26	1	42.9
Savannah Sparrow	1	-	-	T	-	1	-	42.9
Song Sparrow	85	53	100	67	15	60	4	100.0
Swamp Sparrow	T	7	-	-	-	1	-	42.9
White-throated Sparrow	T	-	-	-	-	-	T	28.6
Dark-eyed Junco	T	-	-	-	-	-	-	14.3
Eastern Meadowlark	-	-	-	-	-	18	-	14.3
Bobolink	7	2	-	-	-	16	-	42.9
Brown-headed Cowbird	11	8	-	17	22	6	17	85.7
Orchard Oriole	5	-	-	-	-	-	-	14.3
Red-winged Blackbird	62	39	100	T	22	33	1	100.0
Common Grackle	46	10	67	33	15	2	2	100.0
Baltimore Oriole	13	27	67	17	34	3	24	100.0
Purple Finch	T	-	-	-	-	1	-	28.6
House Finch	15	17	33	33	5	-	3	85.7
Red Crossbill	-	-	-	-	-	-	T	14.3

Table 9-4. Occurrence of birds at point count stations (% of stations with a detection) for 179 species of birds at seven National Park in the Northeast Temperate Network. Point counts were conducted in 2002 and 2003. T = trace, <1% or detected with other survey methods (continued).

Species	BOHA	MIMA	SAIR	WEFA	ROVA	SARA	MORR	% of Parks
American Goldfinch	38	37	33	83	54	38	1	100.0
House Sparrow	11	12	100	33	5	-	1	85.7
Total Number of species	135	62	37	65	81	73	72	178

Among non-passerines, there were some interesting patterns. Chimney Swifts, a declining Neotropical migrant, were detected all parks except SARA (Table 9-2). Chimneys located in historical buildings in parks in the Network provide important nesting habitat for Chimney Swifts, and steps should be taken by resource managers to insure that this species continues to nest in park buildings. Red-bellied woodpeckers were detected in virtually all parks (except SARA), while Hairy Woodpeckers were absent from three. Hairy Woodpeckers have been declining rapidly in the region (BBS trends, -1.9% annual decline from 1980-2002 for Southern New England region), potentially due to aggressive behavior and competition for nest cavities with Red-bellied Woodpeckers, a species that has been increasing rapidly in the region (16.1% annual increase based on BBS routes from 1980-2002). There is little that the Park Service can do to stop the invasion of this southern species, but it is an interesting natural history observation. Another southern species, Worm-eating Warbler, is also expanding its breeding range northward (BBS trends 4.1% annual increase in Southern New England from 1980-2002), and was detected in BOHA, ROVA, and MORR. Yellow-bellied Sapsuckers were detected in only two parks; SARA and MORR. Our observations suggest that this species was potentially on territory in MORR, which is particularly interesting as it would represent one of the only recent nesting records for Yellow-bellied Sapsuckers in New Jersey.

Eight species of flycatchers were detected in Network Parks. Interestingly, Least Flycatchers were only detected in WEFA. This species prefers second-growth forests (DeGraff and Rapplle 1995), thus many of the forests in other parks in the Network may be too old to provide suitable habitat for this semi-colonial species. Yellow-bellied Flycatchers were only detected in SARA.

There were 27 species of warblers that were detected during our surveys. Most of these species were probably on territory and attempting to nest, although several species were definitely migrants passing through to northern breeding grounds. One of the more interesting migratory observations was of a Cerulean Warbler in MORR, a species declining rapidly throughout its range.

Several species of grassland specialists were detected in parks in the Network, including Bobolinks, Eastern Meadowlarks, American Kestrels, and Savannah Sparrows. Grassland specialists were primarily detected in BOHA and SARA, and are a species of interest because they are rapidly declining in the region, mainly due to reforestation. Open grasslands in SARA and at World's End in BOHA provide critical habitat. At SARA in particular, the grasslands in the Park are important to the regional persistence of grassland birds. If feasible, management strategies at BOHA and SARA that are compatible to both biological and historical resources should be implemented to insure that grassland birds continue to nest on park lands.

Our inventory of the avian resources detected in these historical parks shows that a large number of species are utilizing available habitat in the Northeast Temperate Network. Over one-third of the species we detected during our fieldwork were Neotropical migrants, and many of the species we detected are declining in the region. Although these parks are

generally perceived as strictly historical landmarks, the biological resources within these parks are an integral component of their intrinsic value. The results of our initial inventory show that long-term monitoring and active habitat management are warranted to protect avian resources in the Network.

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Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003.

Species	Station 2 N=2 Maritime Shrub	Station 3 N=2 Shore	Station 6 N=2 Shore	Station 7 N=2 Grassland / Open	Station 8 N=3 Grassland / Open	Station 9 N=3 Deciduous Forest
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	1.50, 1.50	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	4.00, 2.00	0	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	0	0
Mallard	0	0	0	0	0	0
Common Eider	0	3.50, 3.50	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	2.00, 0.00	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	0.50, 0.50	1.00, 0.00	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0.33, 0.33
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0.67, 0.67
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 2	Station 3	Station 6	Station 7	Station 8	Station 9
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0.50, 0.50	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0.33, 0.33	0
Blue Jay	0	0	0	0	0.33, 0.33	0
American Crow	0	1.00, 1.00	0	2.00, 2.00	0.33, 0.33	0.33, 0.33
Barn Swallow	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0.67, 0.67
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0.33, 0.33	0
White-breasted Nuthatch	0	0	0	0	0	0.33, 0.33
Carolina Wren	0	0	0	0	0	0.67, 0.33
House Wren	0.50, 0.50	0	0	0	0	0
American Robin	0	0	0	0	0	0
Gray Catbird	0	0	0	0	1.67, 0.33	4.00, 1.73
Northern Mockingbird	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0.67, 0.67
Northern Parula	0	0	0	0	0.33, 0.33	0
Yellow Warbler	1.00, 0.00	0.50, 0.50	0	1.50, 1.50	1.33, 0.33	2.00, 1.00
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0.50, 0.50	0	0	0	0	0
American Redstart	0	0	0	0	1.00, 0.58	1.33, 1.33
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0.50, 0.50	0	0	1.00, 0.00	0	0.33, 0.33
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	1.50, 0.50	1.00, 0.00	0.50, 0.50	2.50, 1.50	4.33, 1.20	1.33, 0.88
Northern Cardinal	0	0	0	0	1.00, 0.58	0.33, 0.33
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	2.33, 1.20	0.33, 0.33
Red-winged Blackbird	1.00, 1.00	0.50, 0.50	0	2.50, 0.50	1.00, 1.00	0.67, 0.67

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 2	Station 3	Station 6	Station 7	Station 8	Station 9
Common Grackle	0.50, 0.50	0	0	0	0	0.67, 0.67
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0.67, 0.67
House Finch	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	1.33, 0.67
House Sparrow	0	0	0	0	0.33, 0.33	0.33, 0.33

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 10 N=2 Grassland / Open	Station 11 N=3 Grassland / Open	Station 12 N=3 Grassland / Open	Station 13 N=3 Grassland / Open	Station 14 N=3 Maritime Shrub	Station 15 N=3 Deciduous Forest
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0.33, 0.33
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	0	0
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	0	0
Greater Yellowlegs	0	0	0	0	0.33, 0.33	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	0	0	0	0	0
Common Tern	0	0	0.67, 0.67	0	0	0
Great Black-backed Gull	0	0	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0	0.33, 0.33	0	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0.33, 0.33	0	0	0	0.67, 0.33
Northern Flicker	0	0.33, 0.33	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0.33, 0.33	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 10	Station 11	Station 12	Station 13	Station 14	Station 15
Great Crested Flycatcher	0	0	0	0	0	0.33, 0.33
Eastern Kingbird	0	0.33, 0.33	0	0.33, 0.33	0.33, 0.33	0
Warbling Vireo	0	0.33, 0.33	0	0.33, 0.33	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0.67, 0.33
American Crow	0	0	0	0.33, 0.33	0.67, 0.67	0.33, 0.33
Barn Swallow	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	1.00, 1.00	0.33, 0.33	3.00, 2.08	0	1.00, 1.00	1.00, 1.00
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0.67, 0.67
White-breasted Nuthatch	0.50, 0.50	0	0.33, 0.33	0	0.33, 0.33	0
Carolina Wren	0	0	0.33, 0.33	0	0	0.67, 0.33
House Wren	0	0	0	0	0	0
American Robin	0	0	0	0	0	0
Gray Catbird	0.50, 0.50	0.67, 0.33	0	0	1.00, 0.00	1.67, 0.33
Northern Mockingbird	0	0	0.33, 0.33	0.33, 0.33	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	4.33, 2.40	1.33, 1.33	0	0
Cedar Waxwing	0	0	1.00, 0.58	1.33, 1.33	0	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0.50, 0.50	1.00, 0.00	0	0.33, 0.33	0.67, 0.67	0
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0.33, 0.33	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	1.00, 0.00	0.67, 0.67	0	0	0.67, 0.33	0
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	3.50, 1.50	1.33, 0.33	1.67, 0.67	1.00, 0.00	1.67, 0.33	0.33, 0.33
Northern Cardinal	0.50, 0.50	0.33, 0.33	0	0	0	1.33, 0.67
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	3.00, 1.53	0.33, 0.33	0
Red-winged Blackbird	5.50, 1.50	8.00, 3.06	3.33, 1.20	5.67, 1.20	1.33, 0.33	0.33, 0.33

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 10	Station 11	Station 12	Station 13	Station 14	Station 15
Common Grackle	1.00, 1.00	0.33, 0.33	0	3.33, 2.85	0	0.33, 0.33
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0.33, 0.33	0.33, 0.33	0	0
Baltimore Oriole	0.50, 0.50	0.33, 0.33	0	0	0.33, 0.33	0
House Finch	0	0	0	0.33, 0.33	0.33, 0.33	0
American Goldfinch	0	0.33, 0.33	0.33, 0.33	0.67, 0.33	0.67, 0.67	0
House Sparrow	0	0	0	0.67, 0.67	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21
	N=2	N=3	N=3	N=3	N=3	N=3
Species	Wetland	Grassland / Open	Grassland / Open	Grassland / Open	Wetland	Wetland
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0.5, 0.50	0	0	0	0	0.33, 0.33
Great Blue Heron	0	0	0	0	0	0
Great Egret	0.5, 0.50	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0.33, 0.33
American Black Duck	0	0	0	0	0	2.67, 1.33
Mallard	0	0	0	0	0	2.33, 2.33
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0.5, 0.5	0	0	2.67, 2.67	0	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	0	0	0	0	0
Least Tern	0	0	0	0	0	0.33, 0.33
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0.67, 0.33	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0.33, 0.33	0	0.33, 0.33	0.33, 0.33	0.67, 0.33
Northern Flicker	0	0	0	0	0.33, 0.33	0
Eastern Wood-Pewee	0	0	0	0	0	0.33, 0.33
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0.33, 0.33	0.33, 0.33	0	0
Warbling Vireo	0	0.33, 0.33	0.33, 0.33	0	0.33, 0.33	0.33, 0.33
Red-eyed Vireo	0	0	0	0	0.67, 0.67	0
Blue Jay	0.5, 0.50	0.33, 0.33	0	0	0	0
American Crow	0.50, 0.50	0	0	0	0	0
Barn Swallow	0	0	0	0	0	0
Tree Swallow	1.00, 1.00	0	0	0	0	0
Black-capped Chickadee	0	2.00, 1.53	0	0	1.67, 1.67	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	1.5, 1.50	0.33, 0.33	0	0	0	0.67, 0.33
White-breasted Nuthatch	0.50, 0.50	0.33, 0.33	0	0	0.33, 0.33	0
Carolina Wren	0	0.33, 0.33	0.33, 0.33	0	0.67, 0.33	0
House Wren	0	0.33, 0.33	0.33, 0.33	0	0	0
American Robin	0	1.00, 0.58	0.33, 0.33	0	2.00, 1.53	0.33, 0.33
Gray Catbird	1.5, 0.50	0.33, 0.33	0.67, 0.33	0	1.00, 0.58	0.33, 0.33
Northern Mockingbird	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0	0	0	0
Cedar Waxwing	0	0	0.33, 0.33	0	0.33, 0.33	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0	0.67, 0.33	0.33, 0.33	1.33, 0.33	2.67, 0.67	0.33, 0.33
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0.33, 0.33	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0	0.33, 0.33	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0	0.33, 0.33	0.33, 0.33	0.33, 0.33	1.33, 0.67	0
Chipping Sparrow	0	0	0	0	0.33, 0.33	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	1.50, 0.50	0	2.0, 0.58	1.33, 0.33	0	0
Northern Cardinal	0.5, 0.5	0.67, 0.67	0	0.33, 0.33	0.67, 0.33	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	1.67, 1.67	1.67, 0.88	0	0	0
Red-winged Blackbird	1.00, 1.00	3.00, 2.52	2.33, 1.20	3.00, 1.53	2.33, 1.86	8.67, 5.17

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21
Common Grackle	1.00, 1.00	2.67, 1.33	0.67, 0.67	0	1.67, 0.88	0
Brown-headed Cowbird	0	0	0	0.67, 0.67	0	0
Orchard Oriole	0	0.67, 0.33	0	0.67, 0.67	0	0
Baltimore Oriole	0	0.33, 0.33	0	0	0.67, 0.67	0.33, 0.33
House Finch	0	0	0	0	0	0
American Goldfinch	0	0.33, 0.33	0	2.00, 1.15	0	0.67, 0.67
House Sparrow	0	0	1.33, 1.33	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 22 N=2 Deciduous Forest	Station 23 N=2 Shore	Station 24 N=4 Deciduous Forest	Station 25 N=4 Shore	Station 26 N=4 Maritime Shrub	Station 27 N=4 Maritime Shrub
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0.25, 0.25	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	0	0
Mallard	0	1.50, 1.50	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0.50, 0.50	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	14.5, 14.50	0	0.75, 0.48	0	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	3.50, 3.50	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0.25, 0.25
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	1.00, 1.00	0	0	0	0	0
Northern Flicker	0.50, 0.50	0	0.25, 0.25	0	0	0.25, 0.25
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0.50, 0.29	0	0.25, 0.25	0.50, 0.29
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 22	Station 23	Station 24	Station 25	Station 26	Station 27
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0
American Crow	0	0	1.00, 0.41	0.25, 0.25	0.25, 0.25	0
Barn Swallow	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0.25, 0.25	0	0.50, 0.29	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	2.00, 2.00	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0.50, 0.50	0	0	0	0	0.25, 0.25
House Wren	0	0	0	0	0	0
American Robin	0.50, 0.50	0	0	0	0	0
Gray Catbird	1.50, 0.50	0	2.50, 1.19	1.50, 0.50	2.5, 0.50	2.25, 0.63
Northern Mockingbird	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0	0	0	0
Cedar Waxwing	0	0	0.50, 0.50	0	0	0.25, 0.25
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0	0.50, 0.50	1.75, 1.18	0.75, 0.25	1.75, 0.25	2.00, 0.41
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0.25, 0.25	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0	0	1.50, 0.29	0.50, 0.29	0.25, 0.25	0.25, 0.25
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	0.50, 0.50	2.00, 0.00	3.25, 0.25	1.00, 0.41	2.75, 0.75	2.75, 0.75
Northern Cardinal	0	0	0.25, 0.25	0.25, 0.25	0.75, 0.25	0.50, 0.29
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	0.50, 0.50	0	0	0	0	0.25, 0.25

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 22	Station 23	Station 24	Station 25	Station 26	Station 27
Common Grackle	0	1.00, 1.00	0.50, 0.29	0	0.75, 0.75	0.25, 0.25
Brown-headed Cowbird	0	0.50, 0.50	0	0	0	0.75, 0.25
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0.50, 0.50	0	0	0	0	0
House Finch	0	0	0	0	0	0
American Goldfinch	0	0	0	0.75, 0.48	2.00, 0.71	0.50, 0.29
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 28 N=4 Maritime Shrub	Station 29 N=3 Deciduous Forest	Station 30 N=3 Pine Forest	Station 31 N=3 Deciduous Forest	Station 32 N=3 Deciduous Forest	Station 33 N=4 Developed
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	0	0
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	0	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0.75, 0.48
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0.25, 0.25
Willow Flycatcher	0.75, 0.25	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0.25, 0.25

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 28	Station 29	Station 30	Station 31	Station 32	Station 33
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0.33, 0.33	0	0	0.25, 0.25
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0.33, 0.33	0	0.33, 0.33	0.33, 0.33	0
Blue Jay	0	1.00, 0.58	0	0.33, 0.33	0	0
American Crow	0	0.33, 0.33	0.67, 0.33	0	0	0.25, 0.25
Barn Swallow	0	0	0.67, 0.67	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0.33, 0.33	1.00, 1.00	0	0	0.25, 0.25
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0.67, 0.33	0	1.67, 0.88	1.67, 0.88	0.50, 0.25
House Wren	0	0	0	0	0	0
American Robin	0	2.00, 0.58	0.67, 0.67	1.33, 0.33	2.00, 1.00	0.50, 0.29
Gray Catbird	2.50, 0.50	0.67, 0.33	2.33, 0.33	1.67, 0.67	0.33	0.50, 0.29
Northern Mockingbird	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0	0	0	2.0, 0.82
Cedar Waxwing	0.25, 0.25	0.67, 0.67	0	0	0	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	1.50, 0.41	0.33, 0.33	1	2.00, 0.58	0.33, 0.33	1.00, 0.41
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0.33, 0.33	0.33, 0.33	0.33, 0.33	0
Worm-eating Warbler	0	0	0	0.33, 0.33	0	0
Common Yellowthroat	0.75, 0.25	0.33, 0.33	1.00, 0.58	0.67, 0.67	0.33, 0.33	0.25, 0.25
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	3.25, 0.75	0.33, 0.33	3.00, 1.53	0	0.33, 0.33	0.75, 0.48
Northern Cardinal	0.50, 0.29	0.67, 0.67	0.33, 0.33	2.00, 0.58	0.67, 0.67	0
Indigo Bunting	0	0	0	0.33, 0.33	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	4.25, 2.29

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 28	Station 29	Station 30	Station 31	Station 32	Station 33
Brown-headed Cowbird	0	0	0	0	0	0.25, 0.25
Common Grackle	0.25, 0.25	0.33, 0.33	0.33, 0.33	0.67, 0.67	0.33, 0.33	3.0, 0.71
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0.25, 0.25
House Finch	0	0	0	0	0.33, 0.33	0.25, 0.25
American Goldfinch	1.25, 0.63	0	0	0	0	0.75, 0.48
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 34 N=4 Grassland / Open	Station 35 N=4 Maritime Shrub	Station 36 N=3 Developed	Station 37 N=4 Developed	Station 38 N=3 Wetland	Station 39 N=3 Shore
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0.33, 0.33	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	7.00, 7.00	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	2.33, 1.45	0
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	2.00, 2.00
Herring Gull	0	0	0	0.25, 0.25	0.33, 0.33	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	0	0	0	0	0
Least Tern	0	0	0	0	0.33, 0.33	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0.25, 0.25	0	0.75, 0.25	0	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0.67, 0.33	0
Downy Woodpecker	0	0	0	0.25, 0.25	0	0
Northern Flicker	0.25, 0.25	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0.25, 0.25	0	0	0	0.33, 0.33	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station34	Station 35	Station 36	Station 37	Station 38	Station 39
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0.33, 0.33	0	0	0
Blue Jay	0.25, 0.25	0	0	0.25, 0.25	0	0
American Crow	0.25, 0.25	0	0	0.25, 0.25	0	0
Barn Swallow	0	0	0	0	0	3.33, 3.33
Tree Swallow	0	0	0	0	0	0.67, 0.67
Black-capped Chickadee	0	0.25, 0.25	0	0.25, 0.25	0	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0.25, 0.25]	0.25, 0.25	1.33, 0.67	0.25, 0.25	0	0.33, 0.33
House Wren	0	0.25, 0.25	0	0	0	0
American Robin	0.25, 0.25	0.75, 0.25	0.67, 0.33	0.25, 0.25	0.33, 0.33	0
Gray Catbird	0.75, 0.25	1.00, 0.71	0.67, 0.33	1.25, 0.25	0.33, 0.33	0.33, 0.33
Northern Mockingbird	0.25, 0.25	0	0.67, 0.33	0	0	0.33, 0.33
Brown Thrasher	0	0	0	0	0	0
European Starling	0.25, 0.25	0	0	0	1.67, 1.67	0
Cedar Waxwing	0	0.50, 0.29	0	0.25, 0.25	0	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0.75, 0.48	1.25, 0.25	1.67, 0.33	1.50, 0.29	1.00, 0.58	1.33, 0.67
Magnolia Warbler	0	0.25, 0.25	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0.50, 0.29	0	0.25, 0.25	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0.25, 0.25	1.00, 0.41	0.33, 0.33	0.25, 0.25	0.33, 0.33	0.33, 0.33
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	3.25, 0.63	1.25, 0.63	1.67, 0.88	1.25, 0.48	2.00, 0.58	3.00, 1.53
Northern Cardinal	0.50, 0.29	0	0.67, 0.33	0.75, 0.25	0	0.33, 0.33
Indigo Bunting	0	0.25, 0.25	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	0.75, 0.48	0	0	0	3.67, 2.67	0.67, 0.67

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station34	Station 35	Station 36	Station 37	Station 38	Station 39
Common Grackle	0	0.25, 0.25	0	0	0.67, 0.33	0.33, 0.33
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0.50, 29	0.25, 0.25	0	0	0	0
House Finch	0	0.75, 0.75	0	0.25, 0.25	0	1.00, 1.00
American Goldfinch	0	0	0.33, 0.33	0.25, 0.25	0	0
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 40 N=3 Maritime Shrub	Station 41 N=3 Shore	Station 42 N=4 Shore	Station 43 N=4 Shore	Station 44 N=3 Shore	Station 45 N=3 Grassland / Open
Red-throated Loon	0.33, 0.33	0	0	0	0	0
Double-crested Cormorant	0	0.67, 0.33	0.50, 0.50	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0.33, 0.33	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	5.00, 5.00	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0.75, 0.75	2.75, 2.75	0	0
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0.50, 0.50	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0.33, 0.33	0	0	0	1.00, 0.58	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	0	0.75, 0.48	0	6.67, 2.03	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	0	0.50, 0.50	0	0.33, 0.33	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0.33, 0.33	0	0.50, 0.29	0.75, 0.48	0.33, 0.33	0.33, 0.33
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0.75, 0.25	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 40	Station 41	Station 42	Station 43	Station 44	Station 45
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0
American Crow	1.33, 1.33	0	0	0	0.33, 0.33	0
Barn Swallow	1.67, 1.67	0	0	0	0	1.33, 1.33
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0.33, 0.33	0	0	0.50, 0.29	0	0
House Wren	0	0	0	0	0	0
American Robin	0	0	0	0	0	0
Gray Catbird	0.67, 0.33	0	0.25, 0.25	0.25, 0.25	0	0.33, 0.33
Northern Mockingbird	0	0	0	0	0	0.33, 0.33
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0	0	0	1.33, 0.88
Cedar Waxwing	0	0	0	0	0	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0.33, 0.33	0.33, 0.33	1.00, 0.00	2.00, 0.41	0	0
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0.25, 0.25	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0.33, 0.33	0	0.50, 0.50	0.50, 0.29	0.33, 0.33	0
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	1.33, 0.88	1.67, 0.33	1.25, 0.25	3.25, 1.60	0.33, 0.33	1.00, 0.58
Northern Cardinal	0.33, 0.33	0	0	0	0.33, 0.33	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0.75, 0.25	0	1.67, 0.33

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 40	Station 41	Station 42	Station 43	Station 44	Station 45
Common Grackle	0	0	0.25, 0.25	0.25, 0.25	0.33, 0.33	0.33, 0.33
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0	0	0	0.33, 0.33	0.67, 0.67
American Goldfinch	0	0	0.25, 0.25	0.50, 0.50	0	0.67, 0.67
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 46 N=3 Grassland / Open	Station 47 N=3 Developed	Station 48 N=3 Wetland	Station 49 N=3 Grassland / Open	Station 50 N=3 Shore	Station 51 N=3 Shore
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0.33, 0.33
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	0	0.67, 0.67
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	1.00, 1.00	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0.33, 0.33
Herring Gull	3.33, 2.03	0.33, 0.33	0	0	0.67, 0.67	3.33, 3.33
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	1.67, 1.20	0	0	0	0.67, 0.67	15.33, 15.33
Least Tern	0	0	0	0	0	0
Rock Dove	0	1.33, 1.33	0	0	0	0
Mourning Dove	0.67, 0.67	0	0	0.67, 0.33	0	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 46	Station 47	Station 48	Station 49	Station 50	Station 51
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0.67, 0.67	0	0	0	0
American Crow	0	0	0.33, 0.33	0	0	0.33, 0.33
Barn Swallow	0	1.67, 1.67	0.33, 0.33	0	0	0.33, 0.33
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0	0	0.33, 0.33	0	0
House Wren	0	0	0	0	0	0
American Robin	0	0	0	0	0	0
Gray Catbird	0	0	1.33, 0.33	2.00, 0.58	0.33, 0.33	0.33, 0.33
Northern Mockingbird	0	0.33, 0.33	0	0	0.33, 0.33	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0.33, 0.33	0.67, 0.33	0	0	2.67, 2.67	8.67, 8.67
Cedar Waxwing	0	0	0	0.67, 0.67	0.33, 0.33	0.33, 0.33
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0	0.33, 0.33	1	2.67, 0.67	1.00, 1.00	0.67, 0.33
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0	0	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.33, 0.33
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	0.33, 0.33	1.00, 0.00	3.00, 0.58	1.67, 0.88	1.67, 0.33	3.00, 1.53
Northern Cardinal	0	0.33, 0.33	0	0.67, 0.67	0	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	1.67, 0.67	1.67, 0.33	2.67, 0.67	0	0	0.33, 0.33

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 46	Station 47	Station 48	Station 49	Station 50	Station 51
Common Grackle	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0.33, 0.33	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0.33, 0.33	0	0	0	0
American Goldfinch	0	0	0	0	1.00, 1.00	0
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 52 N=2 Developed	Station 53 N=2 Developed	Station 69 N=2 Developed	Station 70 N=3 Maritime Shrub	Station 71 N=3 Wetland	Station 72 N=4 Grassland / Open
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0.50, 0.50	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	1.00, 1.00	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0	0	0	0
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0.33, 0.33	0
American Oystercatcher	0	0.50, 0.50	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	8.50, 8.50	0	0	0	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	29.00, 29.00	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0.33, 0.33	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 52	Station 53	Station 69	Station 70	Station 71	Station 72
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0
American Crow	0	0	0	0	0	0
Barn Swallow	0	0	0	0	0	0.25, 0.25
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0
House Wren	0	0	0	0	0	0
American Robin	0	0	0	0	0	0
Gray Catbird	0	0	0	0	0	0
Northern Mockingbird	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0	0	0	0.25, 0.25
Cedar Waxwing	0	0	0	0	0	0.50, 0.50
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0.50, 0.50	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0.75, 0.48
Song Sparrow	1.00, 1.00	1.00, 0.00	3.50, 1.50	2.33, 0.33	2.00, 0.58	1.75, 0.48
Northern Cardinal	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	0	0.50, 0.50	2.50, 1.50	3.33, 1.33	5.67, 2.67	3.50, 0.96

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 52	Station 53	Station 69	Station 70	Station 71	Station 72
Common Grackle	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0	0	0	0	0
American Goldfinch	0	0	0.50, 0.50	0	0	0
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 73 N=3 Grassland / Open	Station 74 N=3 Shore	Station 74 N=3 Shore	Station 76 N=3 Shore	Station 77 N=3 Developed	Station 78 N=3 Grassland / Open
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0.67, 0.67	0	0.33, 0.33	0	0
Mallard	0	0.67, 0.67	0	0	0.33, 0.33	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0.33, 0.33	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0.33, 0.33	0	0	0	0
American Oystercatcher	0	2.00, 0.00	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0.33, 0.33	0	0	0	0
Herring Gull	0	0	0.33, 0.33	0	0	0
Common Tern	0	0	0	0.33, 0.33	0	0
Great Black-backed Gull	0	0.67, 0.67	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0	0	0.33, 0.33	0	1.33, 0.88	0.67, 0.33
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0.33, 0.33
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 73	Station 74	Station 74	Station 76	Station 77	Station 78
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0.33, 0.33	0.67, 0.67
American Crow	0	0.33, 0.33	0	0	1.67, 0.88	1.33, 0.67
Barn Swallow	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0
House Wren	0	0	0	0	0	0
American Robin	0	0	0	1.00, 1.00	1.00, 0.58	1.33, 0.33
Gray Catbird	0	0	0.67, 0.33	1.00, 0.58	1.00, 0.58	1.67, 0.67
Northern Mockingbird	0	0	0	0.33, 0.33	0.67, 0.33	0.33, 0.33
Brown Thrasher	0	0	0	0	0	0
European Starling	0	0	0.33, 0.33	0.33, 0.33	1.33, 0.88	0
Cedar Waxwing	0	0	0	0	0	0.33, 0.33
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0	0	0	1.33, 0.33	0	0
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0	0	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.67, 0.33
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	0.33, 0.33	0	1.33, 0.33	1.33, 0.33	1.33, 0.33	1.33, 0.33
Northern Cardinal	0	0	0	0.67, 0.67	0.33, 0.33	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	4.00, 2.00	0.33, 0.33	0	0.33, 0.33	0.33, 0.33	0.33, 0.33

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 73	Station 74	Station 74	Station 76	Station 77	Station 78
Common Grackle	0	0	0	0	1.00, 0.58	3.33, 2.40
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0	0	0	0	0.33, 0.33
American Goldfinch	0	0	0	0.33, 0.33	0	0.33, 0.33
House Sparrow	0	0	0.33, 0.33	0	4.67, 2.33	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 79 N=2 Wetland	Station 80 N=3 Grassland / Open	Station 81 N=3 Grassland / Open	Station 82 N=3 Grassland / Open	Station 83 N=1 Salt Marsh	Station 84 N=3 Shore
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0	0	0
Great Blue Heron	0	0.33, 0.33	0	0	1.00, 0.00	0
Great Egret	0	0	0.33, 0.33	0	0	0
Snowy Egret	0.50, 0.50	0.33, 0.33	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0.50, 0.50	0.33, 0.33	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	1.00, 1.00	0	0	0	0	0
Mallard	0	0	0.33, 0.33	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0.67, 0.33	0	0.67, 0.33	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	0	1.33, 0.67
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	0	0	0	0	0
Common Tern	0	0	0	0.33, 0.33	0	0
Great Black-backed Gull	0	0	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0.50, 0.50	0.67, 0.67	0.33, 0.33	0.33, 0.33	0	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0.33, 0.33	0	0.33, 0.33
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0.33, 0.33	0	0	0	0.33, 0.33
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0.50, 0.50	0	0.33, 0.33	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 79	Station 80	Station 81	Station 82	Station 83	Station 84
Great Crested Flycatcher	0	0	0.33, 0.33	0	0	0.33, 0.33
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0.33, 0.33	0	0	0	0
American Crow	1.00, 0.50	0	0	0.33, 0.33	0	0
Barn Swallow	0	0	0.33, 0.33	0	0	0.33, 0.33
Tree Swallow	0	0	0	0.67, 0.67	0	0
Black-capped Chickadee	0	0	0.33, 0.33	1.00, 1.00	0	0
Northern Rough-winged Swallow	0	0	0	0	0	1.00, 1.00
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0
House Wren	0	0	0	0	0	0
American Robin	1.50, 0.50	1.00, 0.58	1.67, 1.20	2.00, 0.00	1.00, 0.00	0.33, 0.33
Gray Catbird	0	1.33, 0.67	0.67, 0.33	1.33, 0.88	1.00, 0.00	0
Northern Mockingbird	0	0.33, 0.33	0	0	1.00, 0.00	0
Brown Thrasher	0	0	0.67, 0.33	0	0	0
European Starling	0	0	0.33, 0.33	0	0	0.33, 0.33
Cedar Waxwing	0	0	0.67, 0.67	0.67, 0.33	0	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	2.00, 1.00	2.00, 0.00	1.67, 0.33	0.67, 0.33	0	0.33, 0.33
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0.50, 0.50	1.33, 0.33	0	0.67, 0.67	3.00, 0.00	0.67, 0.67
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	1.50, 0.50	2.00, 0.58	3.67, 1.67	1.67, 0.33	1.00, 0.00	1.00, 0.58
Northern Cardinal	0	0	0.33, 0.33	0	0	0.33, 0.33
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	2.00, 0.00	0.67, 0.67	0.33, 0.33	0	0	0.67, 0.67

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 79	Station 80	Station 81	Station 82	Station 83	Station 84
Common Grackle	0	2.00, 1.53	2.00, 1.53	3.00, 2.52	1.00, 0.00\	0
Brown-headed Cowbird	0.50, 0.50	0	0	0.33, 0.33	1.00, 0.00	1.00, 1.00
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0	0	0.33, 0.33	0	0
American Goldfinch	0.5	0.33, 0.33	0	0.33, 0.33	1.00, 0.00	0.67, 0.67
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 85 N=3 Salt Marsh	Station 86 N=3 Maritime Shrub	Station 87 N=2 Deciduous Forest	Station 88 N=2 Grassland / Open	Station 90 N=3 Deciduous Forest	Station 91 N=3 Maritime Shrub
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0.33, 0.33	0	0	0	0	0
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0	0	0	0	0	0
Green Heron	0	0	0	0	0	2.33, 1.20
Black-crowned Night-Heron	0	0	0	0	0.33, 0.33	0.33, 0.33
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0.67, 0.67	0	0	0	0	0
Mallard	0	0.33, 0.33	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0
American Oystercatcher	0	0	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	0	0	0	0	0	0
Spotted Sandpiper	0	0	0	2.00, 0.00	0	0
Herring Gull	0	0	0	0	0	0
Common Tern	0	0	0	0	0	0
Great Black-backed Gull	0	0	0	0	0	0
Least Tern	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0
Mourning Dove	0.67, 0.33	0.67, 0.33	0	0	0.33, 0.33	0
Great Horned Owl	0	0	0	0	0	0.33, 0.33
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 85	Station 86	Station 87	Station 88	Station 90	Station 91
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0
American Crow	1.00, 0.58	1.67, 0.88	0	0.50, 0.50	0	0
Barn Swallow	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0
Northern Rough-winged Swallow	0	0	0	0	0	0
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0	0.50, 0.50	0	0	0
House Wren	0	0	0	0	0	0
American Robin	0.67, 0.33	1.33, 0.88	0	0	0	0
Gray Catbird	0.67, 0.33	1.00, 0.58	1	0	1.00, 0.58	1.33, 0.33
Northern Mockingbird	0	0	0	0	0	0
Brown Thrasher	0	0	0	0	0	0
European Starling	1.33, 0.88	0	0	0	0	0
Cedar Waxwing	0	0.67, 0.33	0	0	0	1.33, 1.33
Northern Parula	0	0	0	0	0	0
Yellow Warbler	0.33, 0.33	0.67, 0.67	1.00, 0.00	0.50, 0.50	0.67, 0.67	0.67, 0.33
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0.33, 0.33	0	0	0	0
American Redstart	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0.33, 0.33	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	1.00, 0.58	2.33, 0.33	2.00, 1.00	1.50, 0.50	3.00, 0.00	3.00, 0.58
Northern Cardinal	0.33, 0.33	1.67, 0.88	0	0	0	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	0.33, 0.33	0.67, 0.33	2.50, 0.50	1.00, 0.00	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 85	Station 86	Station 87	Station 88	Station 90	Station 91
Common Grackle	1.33, 0.88	0	0	0	0.67, 0.33	0
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0	0	0	0	0
American Goldfinch	0.33, 0.33	1.00, 1.00	0	2.50, 2.50	0	0
House Sparrow	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 95 N=2 Deciduous Forest	Station 96 N=2 Developed	Station 97 N=2 Developed	Station 98 N=2 Developed	Station 99 N=2 Grassland / Open	Station 100 N=2 Developed
Red-throated Loon	0	0	0	0	0	0
Double-crested Cormorant	0	0	0	0.50, 0.50	0	0.50, 0.50
Great Blue Heron	0	0	0	0	0	0
Great Egret	0	0	0	0	0	0
Snowy Egret	0.50, 0.50	0	0	0	0	0
Green Heron	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0
Mute Swan	0	0	0	0	0	0
American Black Duck	0	0	0.50, 0.50	0	0	0
Mallard	0	0	0	0	0	0
Common Eider	0	0	0	0	0	0
Ring-necked Pheasant	0	0	0	0	0	0
Northern Bobwhite	0	0	0	0	0	0
Killdeer	0	0	0	0	0.50, 0.50	0
American Oystercatcher	1.00, 1.00	0	0	0	0	0
Greater Yellowlegs	0	0	0	0	0	0
Willet	1.00, 1.00	0	0	0	0	0
Spotted Sandpiper	0	0	0	0	0	0
Herring Gull	0	10.00, 9.00	32.00, 28.00	1.00, 1.00	9.00, 9.00	13.00, 11.00
Common Tern	0.50, 0.50	0	0	0	0	0
Great Black-backed Gull	0	1.00, 0.00	57.50, 42.50	0	7.50, 7.50	32.00, 28.00
Least Tern	0	0	0	0	0	0
Rock Dove	0	0.50, 0.50	0	0	0	0
Mourning Dove	0	0	0	0	0	0
Great Horned Owl	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0
Northern Flicker	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0
Willow Flycatcher	0	0	0	0	0	0
Eastern Pheobe	0	0	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 95	Station 96	Station 97	Station 98	Station 99	Station 100
Great Crested Flycatcher	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0
American Crow	0	0	0	0	0.50, 0.50	0
Barn Swallow	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0
Northern Rough-winged Swallow	0	1.00, 1.00	0.50, 0.50	0	0	1.50, 1.50
Tufted Titmouse	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0
House Wren	0	0	0	0	0	0
American Robin	0	0	0	0	0.50, 0.50	0
Gray Catbird	0	0	0	0	0	0
Northern Mockingbird	0	0	0	0.50, 0.50	0	0.50, 0.50
Brown Thrasher	0	0	0	0	0	0
European Starling	0	15.00, 14.00	1	1.00, 0.00	0	0
Cedar Waxwing	0	0	0	0	0	0
Northern Parula	0	0	0	0	0	0
Yellow Warbler	1.50, 0.50	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0
Song Sparrow	0.50, 0.50	0	0	0	1.00, 0.00	0
Northern Cardinal	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0
Red-winged Blackbird	4.00, 2.00	0	0	0	1.50, 0.50	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 95	Station 96	Station 97	Station 98	Station 99	Station 100
Common Grackle	1.50, 0.50	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0
Orchard Oriole	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0
House Finch	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0.50, 0.50	0
House Sparrow	0	0	0	2.50, 1.50	2.00, 2.00	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 101 N=2 Developed	Station 102 N=2 Developed	Station 103 N=2 Developed	Station 106 N=2 Shore
Red-throated Loon	0	0	0	0
Double-crested Cormorant	0	1.00, 1.00	0	0
Great Blue Heron	0	0	0	0
Great Egret	0	0	0	0
Snowy Egret	0	0	0	1.50, 0.50
Green Heron	0	0	0	0
Black-crowned Night-Heron	0	0	0	0
Canada Goose	0	0	0	0
Mute Swan	0	0	0	0
American Black Duck	0	0	0	0
Mallard	0	0	0	0.50, 0.50
Common Eider	0	0	0	0
Ring-necked Pheasant	0	0	0	0
Northern Bobwhite	0	0	0	0
Killdeer	0	0	0	0
American Oystercatcher	0	0	0	0
Greater Yellowlegs	0	0	0	0
Willet	0	0	0	0
Spotted Sandpiper	0	0	0	0
Herring Gull	3.50, 3.50	4.00, 4.00	7, 7.00	0
Common Tern	0	0	0	0
Great Black-backed Gull	10.00, 0.00	42.50, 42.50	13.5, 13.5	0
Least Tern	0	0	0	0
Rock Dove	0	1.50, 0.50	0	0
Mourning Dove	0	0	0	0
Great Horned Owl	0	0	0	0
Chimney Swift	0	0	0	0
Belted Kingfisher	0	0	0	0
Downy Woodpecker	0	0	0	0
Northern Flicker	0	0	0	0
Eastern Wood-Pewee	0	0	0	0
Willow Flycatcher	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 101	Station 102	Station 103	Station 106
Eastern Pheobe	0	0	0	0
Great Crested Flycatcher	0	0	0	0
Eastern Kingbird	0	0	0	0
Warbling Vireo	0	0	0	0
Red-eyed Vireo	0	0	0	0
Blue Jay	0	0	0	0
American Crow	0.50, 0.50	0	0	0
Barn Swallow	0	0	0.50, 0.50	0
Tree Swallow	0	0	0	0
Black-capped Chickadee	0	0	0	0
Northern Rough-winged Swallow	0	0.50, 0.50	0	0
Tufted Titmouse	0	0	0	0
White-breasted Nuthatch	0	0	0	0
Carolina Wren	0	0	0	0
House Wren	0	0	0	0
American Robin	0	0	0	0
Gray Catbird	0	0	0	0
Northern Mockingbird	0	0	0	0
Brown Thrasher	0	0	0	0
European Starling	0.50, 0.50	8.50, 2.50	5, 4.00	0
Cedar Waxwing	0	0	0	0
Northern Parula	0	0	0	0
Yellow Warbler	0	0	0	0
Magnolia Warbler	0	0	0	0
Pine Warbler	0	0	0	0
Blackpoll Warbler	0	0	0	0
American Redstart	0	0	0	0
Worm-eating Warbler	0	0	0	0
Common Yellowthroat	0	0	0	0
Chipping Sparrow	0	0	0	0
Savannah Sparrow	0	0	0	0
Song Sparrow	0	0	0	1.50, 1.50
Northern Cardinal	0	0	0	0
Indigo Bunting	0	0	0	0

Appendix 2-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Boston Harbor Islands NPA in 2002 and 2003 (continued).

Species	Station 101	Station 102	Station 103	Station 106
Bobolink	0	0	0	0
Red-winged Blackbird	0.50, 0.50	0.50, 0.50	0	0
Common Grackle	0	0	0	0.50, 0.50
Brown-headed Cowbird	0	0	0	0
Orchard Oriole	0	0	0	0
Baltimore Oriole	0	0	0	0
House Finch	0	0	0	0
American Goldfinch	0	0	0	0
House Sparrow	0.50, 0.50	0	0	0

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003.

Species	Station 1 N=2 Grassland	Station 2 N=2 Forest	Station 3 N=2 Developed	Station 6 N=2 Grassland	Station 7 N=2 Grassland	Station 8 N=2 Forest	Station 10 N=2 Forest	Station 11 N=1 Grassland	Station 12 N=2 Forest	Station 13 N=2 Forest
Mallard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broad-winged Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00
Killdeer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Dove	0.00	0.00	0.00	0.00	3.00, 3.00	0.00	0.00	0.00	0.00	0.00
Mourning Dove	0.00	0.00	1.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	1.50, 1.50	0.00
Chimney Swift	0.00	0.00	0.00	0.00	0.00	0.00	2.00, 2.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Downy Woodpecker	0.00	0.00	0.00	1.00, 1.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Northern Flicker	0.00	0.00	0.00	0.00	0.00	1.00, 0.00	0.00	0.00	0.00	0.00
Eastern Wood-Pewee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Great Crested Flycatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Kingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00
Warbling Vireo	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Red-eyed Vireo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue Jay	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	1.00, 0.00	1.00, 0.00	2.00	0.00	0.50, 0.50
American Crow	1.00, 0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00
Black-capped Chickadee	1.00, 1.00	1.00, 1.00	0.50, 0.50	0.00	1.00, 1.00	0.00	1.00, 0.00	0.00	0.00	0.50, 0.50
Tufted Titmouse	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
White-breasted Nuthatch	0.00	0.00	0.50, 0.50	0.50, 0.50	1.00, 0.00	1.50, 0.50	0.00	0.00	0.50, 0.50	0.00
Carolina Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
House Wren	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00
Blue-gray Gnatcatcher	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Eastern Bluebird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood Thrush	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00, 1.00
American Robin	0.50, 0.50	2.50, 1.50	0.50, 0.50	3.00, 2.00	3.50, 3.50	1.50, 0.50	0.00	0.00	0.50, 0.50	2.00, 1.00
Gray Catbird	1.00, 0.00	0.50, 0.50	0.00	1.00, 0.00	0.00	0.00	0.00	3.00	2.00, 2.00	1.50, 1.50
Northern Mockingbird	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
European Starling	0.00	0.00	1.00, 0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00
Cedar Waxwing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00, 2.00	0.00
Blue-winged Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

Species	Station 1	Station 2	Station 3	Station 6	Station 7	Station 8	Station 10	Station 11	Station 12	Station 13
Yellow Warbler	0.50, 0.50	0.00	0.50, 0.50	3.50, 0.50	0.00	0.00	0.00	1.00	0.50, 0.50	0.00
Magnolia Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pine Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Black-and-White Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Redstart	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ovenbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Yellowthroat	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00
Scarlet Tanager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Towhee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chipping Sparrow	0.50, 0.50	0.00	1.00, 1.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00
Song Sparrow	1.50, 0.50	1.00, 0.00	0.00	0.50, 0.50	0.00	0.00	1.00, 0.00	1.00	1.00, 1.00	2.50, 0.50
Swamp Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Northern Cardinal	0.50, 0.50	1.00, 1.00	1.00, 0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	1.00, 1.00	0.00
Rose-breasted Grosbeak	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indigo Bunting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-winged Blackbird	1.00, 1.00	0.50, 0.50	0.50, 0.50	3.00, 3.00	0.50, 0.50	0.00	0.00	6.00	0.50, 0.50	1.50, 0.50
Common Grackle	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Brown-headed Cowbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baltimore Oriole	0.00	0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00
House Finch	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
American Goldfinch	1.00, 1.00	0.00	0.00	0.00	5.00, 1.00	0.00	0.00	2.00	0.00	0.00
House Sparrow	0.00	0.00	5.50, 4.50	1.00, 1.00	0.50, 0.50	0.00	3.50, 2.50	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21	Station 22	Station 23
	N=2	N=2	N=2	N=2	N=2	N=2	N=1	N=2	N=2	N=2
Species	Grassland	Forest	Grassland	Forest	Grassland	Grassland	Forest	Forest	Grassland	Forest
Mallard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broad-winged Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Killdeer	0.00	0.00	3.50, 0.50	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00
Rock Dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mourning Dove	0.00	0.50, 0.50	2.00, 2.00	0.00	0.00	1.50, 0.50	1.00	0.00	0.00	0.00
Chimney Swift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
Downy Woodpecker	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50
Northern Flicker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Wood-Pewee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alder Flycatcher	0	0	0	0	0	0.50, 0.50	0	0	0	0
Eastern Phoebe	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	1.00	0.00	0.00	0.00
Great Crested Flycatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Kingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warbling Vireo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-eyed Vireo	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
Blue Jay	0.00	0.00	1.50, 0.50	0.00	0.00	0.50, 0.50	0.00	1.50, 0.50	0.00	1.00, 1.00
American Crow	0.50, 0.50	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	1.00, 1.00
Black-capped Chickadee	0.00	1.00, 1.00	0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	1.00	0.00	1.00, 1.00	1.00, 1.00
Tufted Titmouse	0.00	1.00, 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
White-breasted Nuthatch	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00
Carolina Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
House Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue-gray Gnatcatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Bluebird	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood Thrush	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
American Robin	0.00	2.00, 0.00	0.50, 0.50	0.00	1.00, 1.00	0.50, 0.50	0.00	1.00, 1.00	1.00, 1.00	0.00
Gray Catbird	0.50, 0.50	0.50, 0.50	0.00	1.50, 0.50	0.50, 0.50	0.00	0.00	0.50, 0.50	0.50, 0.50	2.00, 1.00
Northern Mockingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
European Starling	0.00	0.00	0.50, 0.50	0.00	4.00, 4.00	0.00	0.00	0.00	0.00	0.00
Cedar Waxwing	1.00, 1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue-winged Warbler	0.50, 0.50	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	1.00, 1.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

Species	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21	Station 22	Station 23
Yellow Warbler	1.00, 0.00	1.50, 0.50	0.50, 0.50	0.50, 0.50	0.00	1.50, 1.50	0.00	1.00, 1.00	0.00	0.50, 0.50
Magnolia Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pine Warbler	0.00	0.00	0.00	0.00	0.00	0.00	2.00	1.50, 1.50	0.00	0.00
Black-and-White Warbler	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.50, 0.50	0.00
American Redstart	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ovenbird	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00, 1.00	0.00	0.00
Common Yellowthroat	0.50, 0.50	0.50, 0.50	0.50, 0.50	1.00, 1.00	1.50, 0.50	2.00, 1.00	0.00	0.00	0.50, 0.50	0.50, 0.50
Scarlet Tanager	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Towhee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chipping Sparrow	0.50, 0.50	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.50, 0.50	0.00
Song Sparrow	2.00, 0.00	2.00, 0.00	2.50, 0.50	0.50, 0.50	1.50, 0.50	3.00, 0.00	4.00	0.00	0.50, 0.50	0.00
Swamp Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Northern Cardinal	0.00	0.00	0.00	0.00	0.50, 0.50	1.00, 0.50	0.00	0.50, 0.50	1.00, 1.00	2.00, 2.00
Rose-breasted Grosbeak	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Indigo Bunting	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
Bobolink	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-winged Blackbird	1.50, 0.50	1.00, 1.00	4.00, 3.00	0.00	2.50, 0.50	0.00	0.00	1.00, 1.00	1.00, 1.00	0.00
Common Grackle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brown-headed Cowbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baltimore Oriole	0.00	0.50, 0.50	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00
House Finch	0.00	2.50, 1.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
American Goldfinch	0.00	0.00	1.00, 1.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	1.00, 1.00
House Sparrow	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued)

	Station 24	Station 25	Station 26	Station 27	Station 28	Station 29	Station 31	Station 32	Station 33	Station 34
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	Forest	Forest	Forest	Grassland	Wetland	Grassland	Grassland	Wetland	Wetland	Wetland
Mallard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broad-winged Hawk	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Killdeer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mourning Dove	0.00	0.00	1.00, 0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00
Chimney Swift	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Downy Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
Northern Flicker	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00
Eastern Wood-Pewee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alder Flycatcher	0	0	0	0	0	0	0	0.50, 0.50	0	0.50, 0.50
Eastern Phoebe	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50
Great Crested Flycatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
Eastern Kingbird	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Warbling Vireo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
Red-eyed Vireo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue Jay	1.00	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00
American Crow	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
Black-capped Chickadee	0.00	0.50, 0.50	0.50, 0.50	0.00	1.00, 1.00	0.50, 0.50	0.00	0.00	0.50, 0.50	0.50, 0.50
Tufted Titmouse	0.50, 0.50	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	1.00, 1.00
White-breasted Nuthatch	0.50, 0.50	0.00	0.00	0.00	2.00, 2.00	0.00	0.00	0.00	0.00	0.00
Carolina Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
House Wren	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue-gray Gnatcatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Bluebird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood Thrush	1.00, 1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Robin	0.00	1.50, 1.50	0.50, 0.50	0.50, 0.50	0.00	0.00	2.00, 0.00	0.00	0.00	0.00
Gray Catbird	0.00	0.50, 0.50	0.50, 0.50	0.00	1.50, 0.50	0.00	2.00, 1.00	0.00	0.50, 0.50	0.00
Northern Mockingbird	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00	0.00
European Starling	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
Cedar Waxwing	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued)

Species	Station 24	Station 25	Station 26	Station 27	Station 28	Station 29	Station 31	Station 32	Station 33	Station 34
Blue-winged Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yellow Warbler	0.00	0.00	2.50, 0.50	0.50, 0.50	1.50, 0.50	0.00	0.50, 0.50	1.50, 0.50	2.50, 0.50	1.50, 0.50
Magnolia Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pine Warbler	1.00, 0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00
Black-and-White Warbler	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
American Redstart	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
Ovenbird	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Yellowthroat	0.50, 0.50	0.00	1.00, 0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	1.50, 0.50	1.00, 1.00	1.00, 1.00
Scarlet Tanager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Towhee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chipping Sparrow	0.00	0.50, 0.50	0.00	0.00	0.50, 0.50	1.00, 1.00	0.50, 0.50	0.00	0.00	0.00
Song Sparrow	0.00	0.00	1.00, 0.00	0.50	1.50, 0.50	0.00	2.00, 0.00	1.50, 0.50	1.50, 0.50	1.00, 0.00
Swamp Sparrow	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	1.00, 1.00	0.50, 0.50	0.50, 0.50
Northern Cardinal	0.50, 0.50	1.50, 0.50	0.00	0.50, 0.50	0.00	1.50, 0.50	1.00, 1.00	0.00	0.50, 0.50	0.00
Rose-breasted Grosbeak	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50
Indigo Bunting	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-winged Blackbird	0.00	0.00	0.00	1.00, 1.00	5.50, 4.50	0.00	0.50, 0.50	1.50, 0.50	4.00, 1.00	5.50, 4.50
Common Grackle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00
Brown-headed Cowbird	0.00	0.00	0.00	0.00	0.00	0.00	3.00, 0.00	0.00	0.00	0.00
Baltimore Oriole	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	2.00, 2.00
House Finch	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
American Goldfinch	0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	2.00, 2.00
House Sparrow	0.00	0.00	0.00	4.50, 1.50	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued)

	Station 35	Station 36	Station 37	Station 38	Station 39	Station 40	Station 41	Station 42	Station 43	Station 44
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	Forest	Forest	Forest	Forest	Forest	Forest	Grassland	Developed	Forest	Forest
Mallard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broad-winged Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Killdeer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mourning Dove	0.00	1.00, 1.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
Chimney Swift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	1.00, 1.00	0.00
Downy Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50
Northern Flicker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Wood-Pewee	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	1.00, 1.00	0.00
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	1.50, 1.50	1.00, 1.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50
Great Crested Flycatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Kingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warbling Vireo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-eyed Vireo	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.50, 0.50	0.50, 0.50	0.00	0.50, 0.50
Blue Jay	0.50, 0.50	0.00	1.00, 0.00	1.50, 0.50	1.50, 0.50	0.00	0.00	0.00	1.50, 0.50	1.50, 1.50
American Crow	0.00	0.00	0.00	1.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
Black-capped Chickadee	0.50, 0.50	0.00	0.50	1.00, 1.00	0.00	0.50, 0.50	0.00	1.00, 1.00	0.00	1.00, 1.00
Tufted Titmouse	1.50, 0.50	0.50, 0.50	2.00, 1.00	0.50, 0.50	2.00, 1.00	1.00, 1.00	0.00	0.00	0.50, 0.50	1.00, 0.00
White-breasted Nuthatch	1.00, 1.00	0.50, 0.50	0.00	2.00, 1.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00
Carolina Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
House Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue-gray Gnatcatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Bluebird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood Thrush	1.00, 1.00	1.00, 0.00	0.50, 0.50	1.00, 0.00	1.50, 1.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.00	0.00
American Robin	1.00, 1.00	1.00, 1.00	1.50, 1.50	1.00, 1.00	0.50, 0.50	0.00	1.00, 0.00	0.50, 0.50	1.00, 1.00	1.50, 0.50
Gray Catbird	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
Northern Mockingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
European Starling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cedar Waxwing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued)

Species	Station 35	Station 36	Station 37	Station 38	Station 39	Station 40	Station 41	Station 42	Station 43	Station 44
Blue-winged Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Yellow Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnolia Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pine Warbler	0.50, 0.50	0.00	0.00	1.00, 1.00	1.00, 1.00	0.00	0.50, 0.50	0.00	0.00	0.00
Black-and-White Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Redstart	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ovenbird	0.50, 0.50	0.50, 0.50	0.00	0.50, 0.50	1.00, 0.00	0.50, 0.50	0.00	0.00	0.00	0.00
Common Yellowthroat	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50
Scarlet Tanager	0.50, 0.50	1.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Towhee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chipping Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Song Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swamp Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Northern Cardinal	0.00	1.00, 1.00	1.00, 1.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.00	0.50, 0.50	0.00
Rose-breasted Grosbeak	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00
Indigo Bunting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-winged Blackbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Grackle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brown-headed Cowbird	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baltimore Oriole	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	1.00, 1.00
House Finch	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	1.50, 0.50	0.00	0.00	0.00
American Goldfinch	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
House Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

	Station 45	Station 46	Station 47	Station 48	Station 49	Station 50	Station 51	Station 52	Station 53	Station 54
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	Forest	Forest	Grassland	Forest	Forest	Forest	Forest	Forest	Forest	Grassland
Mallard	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broad-winged Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Killdeer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mourning Dove	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	1.50, 0.50	0.00
Chimney Swift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Downy Woodpecker	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00
Northern Flicker	0.50, 0.50	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Eastern Wood-Pewee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50
Great Crested Flycatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Kingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50, 0.05
Warbling Vireo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-eyed Vireo	1.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.50, 0.50
Blue Jay	1.00, 1.00	0.00	0.00	0.50, 0.50	0.50, 0.50	1.00, 1.00	0.50, 0.50	1.50, 1.50	0.50, 0.50	0.50, 0.50
American Crow	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.50, 0.50	0.00	1.50, 1.50	1.00, 1.00	0.00
Black-capped Chickadee	0.00	1.50, 1.50	0.00	0.00	0.50, 0.50	1.00, 1.00	0.50, 0.50	0.00	0.00	1.00, 1.00
Tufted Titmouse	1.50, 0.50	1.00, 0.00	0.00	1.50, 0.50	1.00, 1.00	0.00	1.50, 0.50	0.50, 0.50	0.00	0.50, 0.50
White-breasted Nuthatch	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	2.00, 2.00	0.00	0.50, 0.50	0.00
Carolina Wren	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
House Wren	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00
Blue-gray Gnatcatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Bluebird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood Thrush	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Robin	1.50, 1.50	0.50, 0.50	1.00, 0.00	1.50, 0.50	1.00, 0.00	1.00, 1.00	1.00, 0.00	0.00	2.50, 0.50	0.50, 0.50
Gray Catbird	1.00, 1.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	1.00, 1.00	2.00, 1.00
Northern Mockingbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00
European Starling	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	4.00, 4.00
Cedar Waxwing	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue-winged Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

Species	Station 45	Station 46	Station 47	Station 48	Station 49	Station 50	Station 51	Station 52	Station 53	Station 54
Yellow Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnolia Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00
Pine Warbler	0.00	0.00	1.00, 0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00
Black-and-White Warbler	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Redstart	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ovenbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Yellowthroat	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	1.00, 1.00
Scarlet Tanager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Towhee	0.00	0.00	0.00	1.00, 1.00	0.00	1.00, 0.00	0.00	1.00, 1.00	0.00	0.00
Chipping Sparrow	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	1.00, 1.00	0.00
Song Sparrow	0.00	0.50, 0.50	1.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.50, 0.50
Swamp Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Northern Cardinal	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	1.50, 1.50	0.50, 0.50
Rose-breasted Grosbeak	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
Indigo Bunting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-winged Blackbird	0.00	0.00	0.00	3.50, 2.50	0.00	0.00	0.00	0.00	0.00	0.00
Common Grackle	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brown-headed Cowbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baltimore Oriole	0.00	0.00	1.00, 0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.50, 0.50	0.00
House Finch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.00
American Goldfinch	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00	0.50, 0.50
House Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00, 5.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

	Station 55	Station 56	Station 57	Station 58	Station 59	Station 60	Station 61	Station 62	Station 63
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	Forest	Forest	Forest	Forest	Forest	Grassland	Forest	Forest	Forest
Mallard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Broad-winged Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-tailed Hawk	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Killdeer	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00
Rock Dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mourning Dove	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chimney Swift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-bellied Woodpecker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Downy Woodpecker	0.00	0.00	0.00	0.50, 0.50	0.00	1.00, 1.00	0.00	0.00	0.00
Northern Flicker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00
Eastern Wood-Pewee	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.50, 0.50
Alder Flycatcher	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.50, 0.50	0.00	0.00
Great Crested Flycatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Kingbird	0.00	0.00	0.00	0.00	0.00	2.00, 0.00	0.00	0.00	0.00
Warbling Vireo	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
Red-eyed Vireo	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue Jay	0.50, 0.50	1.00, 1.00	1.00, 0.00	0.50, 0.50	0.50, 0.50	0.00	2.50, 1.50	0.00	1.00, 0.00
American Crow	2.00, 2.00	1.00, 1.00	2.00, 2.00	0.00	0.00	0.00	0.00	0.00	0.00
Black-capped Chickadee	0.50, 0.50	0.00	1.50, 1.50	0.00	2.00, 2.00	0.50, 0.50	0.50, 0.50	1.00, 1.00	1.00, 1.00
Tufted Titmouse	1.00, 1.00	2.00, 2.00	1.00, 1.00	1.50, 0.50	1.00, 1.00	0.00	0.00	2.00, 2.00	0.00
White-breasted Nuthatch	0.00	1.00, 1.00	2.00, 2.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00
Carolina Wren	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00
House Wren	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00
Blue-gray Gnatcatcher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eastern Bluebird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wood Thrush	0.50, 0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
American Robin	0.00	0.00	1.00, 0.00	0.00	1.00, 0.00	0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50
Gray Catbird	0.00	0.00	1.00, 0.00	0.00	0.00	0.00	0.00	1.50, 1.50	0.50, 0.50
Northern Mockingbird	0.00	0.00	0.50, 0.50	0.00	0.00	1.50, 0.50	1.00, 1.00	0.00	0.00
European Starling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cedar Waxwing	0.00	0.00	0.00	0.50, 0.50	0.50, 0.50	0.00	0.00	0.00	0.00

Appendix 3-A. Relative abundance (mean \pm SE) of birds detected at each point count station in Minuteman National Historical Park in 2002 and 2003 (continued).

Species	Station 55	Station 56	Station 57	Station 58	Station 59	Station 60	Station 61	Station 62	Station 63
Blue-winged Warbler	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.50, 0.50
Yellow Warbler	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	0.00
Magnolia Warbler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pine Warbler	0.50, 0.50	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00	0.00
Black-and-White Warbler	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
American Redstart	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
Ovenbird	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Common Yellowthroat	0.50, 0.50	0.00	0.00	0.50, 0.50	0.00	1.00, 1.00	0.50, 0.50	1.00, 0.00	1.00, 1.00
Scarlet Tanager	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00, 1.00
Eastern Towhee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chipping Sparrow	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.00	0.00
Song Sparrow	0.00	0.00	1.00, 1.00	0.50, 0.50	0.50, 0.50	1.50, 0.50	0.50, 0.50	0.00	0.00
Swamp Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Northern Cardinal	0.00	0.50, 0.50	0.50, 0.50	0.00	1.50, 0.50	0.00	1.00, 0.00	0.50, 0.50	1.00, 0.00
Rose-breasted Grosbeak	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00
Indigo Bunting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bobolink	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Red-winged Blackbird	0.00	0.00	0.00	0.50, 0.50	0.00	1.00, 1.00	0.00	0.00	0.00
Common Grackle	0.50, 0.50	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.00	0.00
Brown-headed Cowbird	0.00	0.00	0.00	0.00	0.00	0.50, 0.50	0.00	0.50, 0.50	0.00
Baltimore Oriole	0.00	0.00	0.50, 0.50	0.00	0.00	0.00	1.00, 1.00	0.00	0.00
House Finch	0.00	0.00	0.00	0.00	1.00, 1.00	0.00	0.50, 0.50	0.00	0.00
American Goldfinch	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.00	0.50, 0.50	0.00	1.00, 1.00	0.50, 0.50
House Sparrow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix 4-A. Relative abundance (mean \pm SE) of birds detected at each point count station at Saugus Iron Works NHS during breeding season VCP point count surveys in 2002 and 2003.

Species	Station 1	Station 2	Station 3
	(N=6) Developed	(N=6) Wetland	(N=6) Wetland / Forest
Canada Goose	0.00	1.00, 1.00	0.00
Mallard	0.00	0.17, 0.17	0.00
Rock Dove	0.00	0.33, 0.33	0.00
Mourning Dove	0.50, 0.34	0.00	0.17, 0.17
Downy Woodpecker	0.00	0.00	0.17, 0.17
Northern Flicker	0.00	0.17, 0.17	0.00
Eastern Pheobe	0.00	1.00, 0.37	0.00
Blue Jay	0.33, 0.33	0.00	0.17, 0.17
American Crow	0.83, 0.40	1.33, 0.71	2.83, 0.98
Black-capped Chickadee	0.00	0.17, 0.17	0.17, 0.17
Tufted Titmouse	0.00	0.17, 0.17	0.17, 0.17
White-breasted Nuthatch	0.00	0.00	0.33, 0.33
American Robin	1.50, 0.81	1.33, 0.49	0.67, 0.33
Gray Catbird	0.83, 0.48	0.50, 0.22	2.17, 0.70
Northern Mockingbird	0.33, 0.21	0.33, 0.21	0.00
European Starling	4.00, 2.58	4.67, 2.36	3.00, 1.34
Yellow Warbler	0.33, 0.21	0.33, 0.21	0.33, 0.21
Chestnut-sided Warbler	0.00	0.00	0.33, 0.33
Common Yellowthroat	0.33, 0.21	0.17, 0.17	0.67, 0.33
Song Sparrow	0.50, 0.22	1.67, 0.33	1.17, 0.31
Northern Cardinal	0.33, 0.21	0.67, 0.21	1.17, 1.17
Rose-breasted Grosbeak	0.00	0.17, 0.17	0.00
Indigo Bunting	0.00	0.00	0.17, 0.17
Red-winged Blackbird	0.50, 0.34	4.00, 1.00	4.17, 0.91
Common Grackle	0.83, 0.83	0.17, 0.17	0.00
Baltimore Oriole	0.00	0.33, 0.33	0.33, 0.21
House Finch	0.00	0.00	0.17, 0.17
American Goldfinch	0.00	0.00	0.17, 0.17
House Sparrow	15.67, 4.61	0.83, 0.65	10.83, 4.12

Appendix 5-A. Relative abundance (mean \pm SE) of birds detected at each sampling station in Weir Farm NHS during breeding season VCP point count surveys in 2002 and 2003.

Species	Station 1 (N=10) grassland	Station 2 (N=10) grassland	Station 3 (N=10) forest	Station 4 (N=10) forest	Station 5 (N=10) forest	Station 6 (N=10) forest
Canada Goose	0	0.30, 0.30	0	0	0	0
Red-shouldered Hawk	0	0	0.10, 0.10	0	0.10, 0.10	0
Broad-winged Hawk	0	0	0	0	0.10, 0.10	0
Red-tailed Hawk	0	0	0	0	0	0.30, 0.15
Wild Turkey	0	0.10, 0.10	0.10, 0.10	0	0	0.10, 0.10
Mourning Dove	0.20, 0.20	0.10, 0.10	0	0	0.30, 0.15	0
Barn Owl	0	0	0	0.10, 0.10	0	0
Belted Kingfisher	0	0	0	0.10, 0.10	0	0
Red-bellied Woodpecker	0	0.30, 0.15	1.10, 3.50	0.30, 0.15	0.90, 0.23	0.30, 0.15
Downy Woodpecker	0.20, 0.20	0.70, 0.30	0.70, 0.30	0.20, 0.13	0.50, 0.40	0.10, 0.10
Hairy Woodpecker	0.20, 0.13	0.10, 0.10	0.20, 0.13	0	0.30, 0.15	0
Northern Flicker	0.10, 0.10	0	0	0	0	0
Pileated Woodpecker	0	0	0.10, 0.10	0.10, 0.10	0.10, 0.10	0
Eastern Wood-Pewee	0.10, 0.10	0	0.10, 0.10	0.20, 0.13	0.40, 0.22	0.40, 0.22
Least Flycatcher	0	0	0.10, 0.10	0	0.40, 0.22	0
Eastern Pheobe	0	0.10, 0.10	0	0	0	0.40, 0.22
Great Crested Flycatcher	0.80, 0.25	0.40, 0.22	0	0.20, 0.13	0.20, 0.13	0.10, 0.10
Eastern Kingbird	0	0	0	0.10, 0.10	0	0
White-eyed Vireo	0	0	0.20, 0.20	0	0	0
Yellow-throated Vireo	0.10, 0.10	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0.10, 0.10
Red-eyed Vireo	0.70, 0.26	0.10, 0.10	0.80, 0.36	0.20, 0.13	1.00, 0.33	0.40, 0.16
Blue Jay	0.30, 0.21	0.80, 0.33	0.90, 0.28	1.10, 0.46	0.50, 0.22	0.80, 0.33
American Crow	1.50, 0.56	1.10, 0.41	0.10, 0.10	0.30, 0.15	0.90, 0.41	1.00, 0.70
Black-capped Chickadee	2.80, 0.89	1.10, 0.89	0.30, 0.15	0.20, 0.20	1.00, 0.54	0.50, 0.22
Tufted Titmouse	1.60, 0.52	2.70, 0.52	2.80, 0.83	1.80, 0.63	1.90, 0.57	1.70, 0.52
White-breasted Nuthatch	0.50, 0.22	0.60, 0.27	0.60, 0.31	0.10, 0.10	0.70, 0.21	0.90, 0.28
Brown Creeper	0	0	0.20, 0.13	0	0	0.20, 0.13
Carolina Wren	0	0	0	0	0	0.10, 0.10
House Wren	0.20, 0.13	0.40, 0.31	0	0	0.10, 0.10	0
Eastern Bluebird	0.90, 0.18	0.90, 0.28	0	0	0	0.20, 0.13
Wood Thrush	0.20, 0.13	0.10, 0.10	0	0.20, 0.20	0.20, 0.13	0.30, 0.21
American Robin	0.30, 0.30	0.10, 0.10	0.10, 0.10	0.20, 0.20	0.80, 0.33	0.60, 0.27
Gray Catbird	0	0.40, 0.16	0	0	0.10, 0.10	0
Northern Mockingbird	0	0.50, 0.31	0	0	0	0
European Starling	0.30, 0.30	0.20, 0.20	0	0	0	0
Cedar Waxwing	0.80, 0.55	0	0	0.20, 0.20	0	0
Magnolia Warbler	0.20, 0.20	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0.10, 0.10
Pine Warbler	0.20, 0.20	0	0	0	0	0
Black-and-White Warbler	0.10, 0.10	0.10, 0.10	0	0.10, 0.10	0.10, 0.10	0.10, 0.10
Ovenbird	0.30, 0.15	0	2.20, 0.42	1.30, 0.26	1.10, 0.31	0.60, 0.22
Northern Waterthrush	0	0	0	0.10, 0.10	0	0
Louisiana Waterthrush	0	0	0.10, 0.10	0.30, 0.15	0.20, 0.13	0
Wilson's Warbler	0	0	0	0.10, 0.10	0	0
Scarlet Tanager	0.20, 0.13	0	0	0.60, 0.22	0	0.30, 0.21

Appendix 5-A. Relative abundance (mean \pm SE) of birds detected at each sampling station in Weir Farm NHS during breeding season VCP point count surveys in 2002 and 2003 (continued)

Species	Station 1 (N=10) grassland	Station 2 (N=10) grassland	Station 3 (N=10) forest	Station 4 (N=10) forest	Station 5 (N=10) forest	Station 6 (N=10) forest
Eastern Towhee	0	0.10, 0.10	0	0	0	0
Chipping Sparrow	3.20, 0.94	1.10, 0.38	0	0	0	0
Field Sparrow	0.10, 0.10	0	0	0	0	0
Song Sparrow	0	1.10, 0.53	0.20, 0.13	0	0.10, 0.10	0.20, 0.13
Northern Cardinal	0.50, 0.22	0.70, 0.26	1.50, 0.50	0.40, 0.22	0.60, 0.27	0.60, 0.34
Common Grackle	0	0.10, 0.10	0	0	0	0.10, 0.10
Brown-headed Cowbird	0	0	0.10, 0.10	0	0	0
Baltimore Oriole	0	0	0	0	0	0.10, 0.10
House Finch	0.40, 0.40	1.80, 1.24	0	0	0	0
American Goldfinch	1.10, 0.55	1.10, 0.43	0.40, 0.22	0.10, 0.10	0.10, 0.10	0
House Sparrow	0.30, 0.15	1.90, 1.10	0	0	0	0

Appendix 6-A. Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003.

	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7	Station 8	Station 9	Station 10	Station 11
	VAMA	VAMA	VAMA	VAMA	VAMA	VAMA	VAMA	VAMA	VAMA	VAMA	VAMA
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	Managed	D. Forest	Grassland	Managed	Grassland	Managed	D. Forest	Managed	D. Forest	Managed	Managed
Green Heron	0	0	0	0	0	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0	0	0.50, 0.50	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Ring-billed Gull	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0.50, 0.50	1.00, 0.00	0	0.50, 0.50	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	1.00, 1.00	0	0	0	0	0
Red-bellied Woodpecker	1.00, 0.00	0.50, 0.50	0	0	1.00, 0.00	0	1.00, 0.00	0.50, 0.50	0.50, 0.50	1.00, 0.00	0.50, 0.50
Downy Woodpecker	0	0	0	0	0.50, 0.50	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0.50, 0.50	0	0.50, 0.50	0	0	0	0	0
Yellow-shafted Northern Flicker	0.50, 0.50	0	0	0	0	0	0	0.50, 0.50	0	0	0
Pileated Woodpecker	0.50, 0.50	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	0.50, 0.50	0	0	0	0	0.50, 0.50	0.50, 0.50	0.50, 0.50	0	0
Willow Flycatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	0.50, 0.50	0	0.50, 0.50	0
Great Crested Flycatcher	0.50, 0.50	0	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	1.50, 0.50	0
Eastern Kingbird	0	0	0.50, 0.50	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	1.00, 1.00	1.00, 0.00	0.50, 0.50	0	1.00, 1.00	0.50, 0.50	1.50, 0.50	0	0	0.50, 0.50	0.50, 0.50
Blue Jay	0	0.50, 0.50	0	1.00, 1.00	0	0.50, 0.50	0	1.00, 0.00	0	0.50, 0.50	0
American Crow	0.50, 0.50	0	1.00, 1.00	1.50, 0.50	0	3.50, 3.50	0.50, 0.50	0	0	1.50, 0.50	1.00, 1.00
Barn Swallow	0	0	0	0	0	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	1.00, 0.00	0	0.50, 0.50	0
Eastern Tufted Titmouse	1.00, 0.00	1.00, 0.00	0.50, 0.50	1.50, 0.50	0	0.50, 0.50	1.00, 0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	1.50, 0.50
White-breasted Nuthatch	0.50, 0.50	0	0	0	0	0	0	0	0	0.50, 0.50	0
Carolina Wren	0	0	0.50, 0.50	0	0.50, 0.50	0	0	0	0	0	0

Appendix 6-A. Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

Species	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7	Station 8	Station 9	Station 10	Station 11
House Wren	0	0	0	0	0	0.50, 0.50	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0.50, 0.50	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0.50, 0.50	0	0.50, 0.50	0	0	0	0.50, 0.50	0.50, 0.50	0	0	0
American Robin	0	0	0	0.50, 0.50	0	0.50, 0.50	0	0.50, 0.50	0	2.00, 2.00	1.50, 0.50
Gray Catbird	0.50, 0.50	0	0	0	0	0	0	0	0	0	0
Northern Mockingbird	0	0	0	0	0	0	0	0.50, 0.50	0	0.50, 0.50	0
European Starling	0	0	0	0.50, 0.50	1.50, 1.50	2.50, 0.50	0	0	0	0	1.50, 1.50
Cedar Waxwing	0	0	0	0	15.00, 15.00	1.50, 1.50	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0.50, 0.50	0	0	0.50, 0.50	0	0	0	0	0	0
Worm-eating Warbler	0	1.50, 0.50	0	0	0	0	0.50, 0.50	0	0.50, 0.50	0	0
Ovenbird	0	0	0	0	0	0	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0.50, 0.50	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0.50, 0.50	0	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	0	0.50, 0.50	0	0
Eastern Towhee	0	0	0	0	0	0	0	0	0	0.50, 0.50	0
Chipping Sparrow	0	0	0	1.50, 1.50	0	1.00, 0.00	0	1.00, 0.00	0	1.50, 0.50	0.50, 0.50
Song Sparrow	0.50, 0.50	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	1.00, 0.00	0.50, 0.50	1.00, 1.00	1.00, 1.00	1.00, 1.00	0.50, 0.50	0	0	1.00, 1.00	0	1.00, 0.00
Rose-breasted Grosbeak	0	0.50, 0.50	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0.50, 0.50	1.00, 0.00	1.00, 0.00	0	0.50, 0.50	0	0.50, 0.50	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0.50, 0.50	0.50, 0.50	0	12.00, 8.00	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0.50, 0.50	0	0	0	0.50, 0.50	0
Baltimore Oriole	1.00, 0.00	0.50, 0.50	0	0	0	0	0	1.00, 0.00	0	0	0
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0.50, 0.50	0.50, 0.50	2.00, 2.00	1.00, 0.00	2.50, 0.50	0.50, 0.50	2.50, 2.50	1.00, 1.00	0.50, 0.50	2.50, 1.50	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 6-A Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

	Station 12	Station 13	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21	Station 22
	VAMA	VAMA	VAMA	HOFR	HOFR	HOFR	HOFR	HOFR	HOFR	HOFR	HOFR
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	Grassland	Managed	Managed	D. Forest	D. Forest	Managed	D. Forest	M. Forest	M. Forest	Managed	F. Wetland
Green Heron	0	0	0	0	0	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	1.50, 1.50	0	0	0	0	0
Ring-billed Gull	0	0.50, 0.50	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0.50, 0.50	0	0	0	0.50, 0.50	0.50, 0.50	0.50, 0.50
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	0.50, 0.50	0	0	0	0	0.50, 0.50	1.00, 0.00	0.50, 0.50	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0.50, 0.50	0	0
Hairy Woodpecker	0	0	0	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	0.50, 0.50	0	0	0
Yellow-shafted Northern Flicker	0	0.50, 0.50	0	0	0	0	0	0.50, 0.50	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0.50, 0.50
Eastern Wood-Pewee	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	1.00, 0.00	0	0	0.50, 0.50	1.00, 0.00	0	0.50, 0.50
Willow Flycatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0.50, 0.50	0.50, 0.50	0	0	0	0
Great Crested Flycatcher	0.50, 0.50	1.50, 0.50	1.00, 0.00	0.50, 0.50	0.50, 0.50	1.00, 1.00	0	0.50, 0.50	0	0	1.00, 1.00
Eastern Kingbird	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	2.00, 0.00	1.00, 1.00	1.50, 0.50	1.00, 1.00	1.50, 0.50	0	0.50, 0.50	1.50, 0.50	1.00, 0.00	0	0
Blue Jay	0.50, 0.50	0	0	0	0	0	0	0	0.50, 0.50	0	0.50, 0.50
American Crow	0	3.00, 3.00	1.00, 0.00	0	0	1.50, 0.50	0	0	0	0.50, 0.50	1.00, 1.00
Barn Swallow	0	0	0	0	0	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0.50, 0.50	0	0	0	0	0.50, 0.50	0	0	0.50, 0.50	0.50, 0.50	1.00, 1.00
Eastern Tufted Titmouse	1.50, 0.50	2.00, 1.00	1.50, 1.50	0.50, 0.50	0	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	1.00, 0.00	0.50, 0.50
White-breasted Nuthatch	0	0	0	0	0	0	0	0.50, 0.50	0	0.50, 0.50	1.00, 1.00
Carolina Wren	0	0	0	0	0	0	0.50, 0.50	0	0	0	0

Appendix 6-A Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

Species	Station 12	Station 13	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21	Station 22
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	0	0.50, 0.50	1.50, 0.50	0	0	0.50, 0.50	2.00, 2.00	0	0.50, 0.50
American Robin	0	0.50, 0.50	1.00, 1.00	0	0	0	0	0	0	3.00, 0.00	0.50, 0.50
Gray Catbird	0	0.50, 0.50	0	0	0	1.00, 0.00	0	0	0	0.50, 0.50	0
Northern Mockingbird	0	0.50, 0.50	0	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0.50, 0.50	0	0	0	0.50, 0.50	0
Cedar Waxwing	0	0	0	0	0	0.50, 0.50	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0
Worm-eating Warbler	0.50, 0.50	0	0	0.50, 0.50	0	0	0.50, 0.50	0	0	0	0
Ovenbird	0	0	0	0	0	0	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	0	0.50, 0.50	0	1.00, 1.00
Common Yellowthroat	0	0	0	0	0	0	0.50, 0.50	0	0	0	0
Scarlet Tanager	0	0	0	0.50, 0.50	0	0	0.50, 0.50	0.50, 0.50	1.00, 0.00	0	0
Eastern Towhee	0	0	0	0	0	0	0	0	0	0	0
Chipping Sparrow	0	1.00, 1.00	0	0	0	1.50, 0.50	0	0	0	2	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	2.50, 0.50	0	0.50, 0.50	0	0.50, 0.50	1.00, 1.00	0	0	0.50, 0.50	0.50, 0.50	0.50, 0.50
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0.50, 0.50	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0.50, 0.50
Common Grackle	0	0	0	0	0	0	0	0	0	0	0.50, 0.50
Brown-headed Cowbird	0.50, 0.50	0	0	2.00, 2.00	0	0	0	0	0.50, 0.50	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0.50, 0.50	0
House Finch	0	0	0	0	0	1.00, 1.00	0	0	0	0.50, 0.50	0
American Goldfinch	1.00, 0.00	0	0	0	0	0	0	0	0	0.50, 0.50	0.50, 0.50
House Sparrow	0	0	0	0	0	1.00, 1.00	0	0	0	1.00, 0.00	0

Appendix 6-A. Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

	Station 23	Station 24	Station 25	Station 26	Station 27	Station 28	Station 29	Station 30	Station 31	Station 32	Station 33
	HOFR	HOFR	HOFR	HOFR	HOFR	HOFR	HOFR	HOFR	ELRO	ELRO	ELRO
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	D. Forest	Grassland	Grassland	M. Forest	C. Forest	Grassland	M. Forest	D. Forest	Wetland	Managed	Wetland
Green Heron	0	0	0	0	0	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0	0.50, 0.50	0	0	0	0
Canada Goose	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0.50, 0.50	0	0
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Ring-billed Gull	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0.50, 0.50	1.00, 0.00	0	1.00, 0.00	0.50, 0.50	2.00, 0.00	0	0	0.50, 0.50	0.50, 0.50	0
Yellow-billed Cuckoo	0	0	0	0	0	0.50, 0.50	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	0.50, 0.50	1.00, 0.00	0	0.50, 0.50	0.50, 0.50	1.00, 0.00	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	1.00, 0.00
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0.50, 0.50	1.00, 0.00	0	0	0	0	0	0.50, 0.50
Yellow-shafted Northern Flicker	0	0	0	0	0	1.00, 0.00	0.50, 0.50	0	0	0	0
Pileated Woodpecker	0	0	0	0	0.50, 0.50	0	0	0	0	0	0
Eastern Wood-Pewee	0.50, 0.50	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	0	0	1.00, 0.00	0	0	0
Willow Flycatcher	0	0	0	0	0	0	0	0	0	0	0.50, 0.50
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0.50, 0.50	1.00, 0.00	0	0.50, 0.50	0.50, 0.50	2.00, 0.00	0.50, 0.50	0.50, 0.50	0	1.00, 1.00	0
Eastern Kingbird	0	0.50, 0.50	0.50, 0.50	0	0	0.50, 0.50	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0.50, 0.50	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0.50, 0.50
Red-eyed Vireo	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	1.00, 0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0	0.50, 0.50
Blue Jay	1.50, 1.50	0.50, 0.50	0	0	0	0	0.50, 0.50	1.50, 0.50	0	0	0
American Crow	0.50, 0.50	0	1.00, 1.00	0	0	0	0	0.50, 0.50	1.00, 1.00	1.00, 0.00	0
Barn Swallow	0	0	0	0	0	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0.50, 0.50	0	1.00, 1.00	0.50, 0.50	0.50, 0.50	0	0	0	0.50, 0.50	1.00, 1.00	0.50, 0.50
Eastern Tufted Titmouse	0.50, 0.50	0.50, 0.50	1.00, 1.00	0.50, 0.50	0	1.00, 1.00	0	0.50, 0.50	1.00, 0.00	0.50, 0.50	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0.50, 0.50	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0

Appendix 6-A. Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

Species	Station 23	Station 24	Station 25	Station 26	Station 27	Station 28	Station 29	Station 30	Station 31	Station 32	Station 33
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0.50, 0.50	0	0	0	0	0	0	0	0
Veery	0	0.50, 0.50	0	0	0	0	0	0.50, 0.50	0	1.00, 0.00	0
Wood Thrush	0.50, 0.50	0	0	0	1.50, 0.50	0.50, 0.50	0.50, 0.50	0.50, 0.50	0	0	0
American Robin	0	0	0.50, 0.50	0	0	0	0	0	0	0.50, 0.50	0
Gray Catbird	0	0	0	0	0	0	0.50, 0.50	0	0.50, 0.50	2.00, 1.00	2.00, 0.00
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	1.50, 1.50	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	1.00, 0.00	0	0	0	1.00, 0.00
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0.50, 0.50	0	0	0
Worm-eating Warbler	0	0	0	0	0	0	1.00, 0.00	0	0	0	0
Ovenbird	0	0	0	0	0	0	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0.50, 0.50	0	0	0
Common Yellowthroat	0	0.50, 0.50	0	0	0	0.50, 0.50	0	0	2.50, 0.50	0	0
Scarlet Tanager	0	1.50, 0.50	0	1.00, 0.00	0.50, 0.50	0.50, 0.50	0.50, 0.50	1.00, 1.00	0	0	0
Eastern Towhee	0	0	0	0	0	0	0	0	0	0	0
Chipping Sparrow	0	0.50, 0.50	2.00, 0.00	0	0	0.50, 0.50	0	0	0.50, 0.50	0	0
Song Sparrow	0	0	0	0	0	0.50, 0.50	0	0	2.00, 0.00	0	1.00, 0.00
Northern Cardinal	0.50, 0.50	0.50, 0.50	1.50, 0.50	0	0.50, 0.50	1.00, 1.00	0	1.00, 1.00	1.50, 0.50	2.00, 0.00	0
Rose-breasted Grosbeak	0	0	0	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	0	0	0	0
Indigo Bunting	0	1.00, 0.00	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	1.50, 1.50	0	0	0	1.00, 1.00	0.50, 0.50	0	2.00, 1.00	0	0.50, 0.50
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0.50, 0.50	0	0	1.00, 1.00	0	0.50, 0.50
Baltimore Oriole	0	1.00, 0.00	1.00, 0.00	0	0.50, 0.50	0.50, 0.50	1.00, 0.00	0	0	0	1.00, 0.00
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0.50, 0.50	0.50, 0.50	0	0	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	1.00, 1.00
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 6-A. Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

	Station 34	Station 35	Station 36	Station 37	Station 38	Station 39	Station 40	Station 41
	ELRO	ELRO	ELRO	ELRO	ELRO	ELRO	ELRO	ELRO
	N=2	N=2	N=2	N=2	N=2	N=2	N=2	N=2
Species	D. Forest	F. Wetland	Managed	D. Forest	F. Wetland	D. Forest	M. Forest	Managed
Green Heron	0	0.50, 0.50	0	0	0	0	0	0
Black-crowned Night-Heron	0	0	0	0	0	0	0	0
Canada Goose	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	1.00, 1.00
Red-tailed Hawk	0	0	0	0	0	0	0	0.50, 0.50
Wild Turkey	0	0	0	0	0	0	0	0
Ring-billed Gull	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0.50, 0.50	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0
Chimney Swift	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	1.00, 0.00	0.50, 0.50	0.50, 0.50	1.00, 1.00	0	1.00, 0.00	0.50, 0.50	0
Downy Woodpecker	0.50, 0.50	0	0	0	0.50, 0.50	0	0	0
Hairy Woodpecker	0	0	0	0.50, 0.50	0	0	0	0
Yellow-shafted Northern Flicker	0.50, 0.50	0	0	0	0	0.50, 0.50	0	0.50, 0.50
Pileated Woodpecker	0	0	0	0	0	0.50, 0.50	0.50, 0.50	0
Eastern Wood-Pewee	1	0	0	0.50, 0.50	0.50, 0.50	1.00, 0.00	1.00, 0.00	1.00, 0.00
Willow Flycatcher	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0.50, 0.50	0	0	0	0	0
Great Crested Flycatcher	1	0	0	0	0.50, 0.50	0	0	0.50, 0.50
Eastern Kingbird	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0
Warbling Vireo	0.50, 0.50	0.50, 0.50	1.00, 0.00	0	0	0	0	0
Red-eyed Vireo	2.00, 1.00	1.00, 0.00	0.50, 0.50	0.50, 0.50	1.00, 0.00	0.50, 0.50	1.00, 0.00	0.50, 0.50
Blue Jay	0.50, 0.50	0	0	0	0	1.50, 1.50	0	1.00, 0.00
American Crow	0	1.00, 0.00	1.00, 1.00	0	0	0	0.50, 0.50	1.00, 0.00
Barn Swallow	0	0	1.00, 1.00	0	0	0	0	0
Tree Swallow	0	0	0.50, 0.50	0	0	0	0	0
Black-capped Chickadee	0.50, 0.50	0.50, 0.50	0	0	0	0.50, 0.50	2.00, 2.00	0
Eastern Tufted Titmouse	0.50, 0.50	1.00, 0.00	1.00, 0.00	0.50, 0.50	1.00, 0.00	1.00, 1.00	0.50, 0.50	1.50, 0.50
White-breasted Nuthatch	0	0	0	0	0	0	1.00, 0.00	0
Carolina Wren	0	0	0	0	0	0	0	0

Appendix 6-A. Relative abundance (mean \pm SE) of birds detected at each point count stations in Roosevelt-Vanderbilt in 2002 and 2003 (continued).

	Station 34	Station 35	Station 36	Station 37	Station 38	Station 39	Station 40	Station 41
House Wren	0	1.00, 0.00	1.00, 0.00	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0
Veery	0.50, 0.50	0	0.50, 0.50	0.50, 0.50	0	0	0.50, 0.50	0
Wood Thrush	0	0.50, 0.50	0	0.50, 0.50	1.50, 0.50	0.50, 0.50	1.00, 1.00	0
American Robin	0	0.50, 0.50	0.50, 0.50	0	0.50, 0.50	0	0	0
Gray Catbird	2.50, 0.50	0	1.00, 1.00	0.50, 0.50	0	0	0	2.00, 0.00
Northern Mockingbird	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0.50, 0.50	0	0	0	0	0.50, 0.50
American Redstart	0.50, 0.50	0	0	0.50, 0.50	0	0	0	0
Worm-eating Warbler	1.00, 0.00	0	0	0	0	0.50, 0.50	0	0
Ovenbird	0.50, 0.50	0	0	0	0	0.50, 0.50	1.00, 0.00	0.50, 0.50
Louisiana Waterthrush	0	0	0	0	0.50, 0.50	0	0	0
Common Yellowthroat	0	0	0	0.50, 0.50	0	0	0	0
Scarlet Tanager	1.00, 0.00	0	0	0	0	0.50, 0.50	0.50, 0.50	0
Eastern Towhee	0	0	0	0	0	0	0	0
Chipping Sparrow	0	0	0.50, 0.50	0	0	0	0	0
Song Sparrow	0	0.50, 0.50	1	0	0	0	0	0
Northern Cardinal	1.00, 1.00	0.50, 0.50	1.00, 1.00	0.50, 0.50	0	1.00, 0.00	0	1.50, 0.50
Rose-breasted Grosbeak	0	0.50, 0.50	0	0	0	0	0.50, 0.50	0
Indigo Bunting	0.50, 0.50	0	0	0.50, 0.50	0	0	0	0
Red-winged Blackbird	0	3.50, 1.50	1.50, 0.50	0	0	1.00, 1.00	0	0
Common Grackle	0	0.50, 0.50	0	0	0	0.50, 0.50	0	0
Brown-headed Cowbird	0	0	0.50, 0.50	0	0	0	0	0
Baltimore Oriole	1.00, 0.00	0	0.50, 0.50	0.50, 0.50	0	0	1.00, 1.00	0
House Finch	0	0	0	0	0	0	0	0
American Goldfinch	0.50, 0.50	0	1.00, 0.00	0	0	0	0	0.50, 0.50
House Sparrow	0	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003.

Species	Station 8 Forest	Station 9 Forest	Station 10 Forest	Station 11 Grassland	Station 12 Forest	Station 13 Forest	Station 14 Forest	Station 16 Forest	Station 17 E.S. Edge	Station 18 E.S. Edge	Station 19 Developed	Station 22 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	1	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	1	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	1	1	0	1	0	0	0	0	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	1	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	1	0	0	0	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	1	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	1	0	1	0	0	0	1	0	0	1	0
Blue Jay	0	0	0	2	1	0	0	0	0	0	1	0
American Crow	2	1	2	0	0	2	2	1	1	0	0	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	1	1	0	0	2	0	0	0	0	2
Eastern Tufted Titmouse	1	0	0	0	0	0	0	0	0	0	1	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	1	0	0	0	0	0	0	1	0
House Wren	0	0	0	0	0	1	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0	2

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 8	Station 9	Station 10	Station 11	Station 12	Station 13	Station 14	Station 16	Station 17	Station 18	Station 19	Station 22
Swainson's Thrush	0	0	1	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	0	0	0	0	0	0	0	0	0	0
American Robin	1	0	0	1	4	1	0	0	0	0	1	0
Gray Catbird	0	0	1	1	1	1	1	0	0	0	0	1
European Starling	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	3	0	0	0	0	0	0	0	0	0	0	1
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	1	1	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	1	0	0	1	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	2	0	0	1	0	0	0	1	0	0	1	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	2	2	1	1	1	1	1	4
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	0	0	0	0	0	1	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	1	1	0	2	2	1	1	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	1	0	2	2	1	1	1	1	0	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	1	1	1	1	0	0	0	0	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	1	0
Bobolink	0	0	0	0	0	1	0	0	0	1	0	0
Red-winged Blackbird	0	0	0	0	3	1	0	0	4	1	0	0
Eastern Meadowlark	0	0	0	0	0	1	0	0	0	2	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	1	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	2	2	0	3	2	1	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 26 Forest	Station 29 Wet Field	Station 31 Forest	Station 32 Forest	Station 34 Forest	Station 35 Forest	Station 37 Forest	Station 38 Forest	Station 39 Forest	Station 41 Forest	Station 42 F. Stream	Station 43 Forest
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	1	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	1	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	1	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	2	1	1	1	0	1	1	0
Yellow-bellied Flycatcher	0	0	0	1	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	1	0	0	0	1	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0	0	0	1	0	1	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	1	0
Red-eyed Vireo	0	0	0	1	2	1	1	1	2	1	0	1
Blue Jay	1	0	0	0	1	0	1	1	1	0	0	0
American Crow	1	2	0	0	1	1	1	0	1	0	1	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	3	4	2	1	1	1	0	0	3	0	0	0
Eastern Tufted Titmouse	1	0	0	1	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	1	0	0	0	0	0	0	0	1
House Wren	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	1	0	0	0	0	0	0	0	1

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 26	Station 29	Station 31	Station 32	Station 34	Station 35	Station 37	Station 38	Station 39	Station 41	Station 42	Station 43
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	1	0
Wood Thrush	0	0	0	0	0	0	0	0	0	1	0	0
American Robin	0	1	1	0	0	0	0	0	1	1	1	0
Gray Catbird	2	0	0	0	0	0	0	0	0	0	2	0
European Starling	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	0	0	0	1	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	1	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	1	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	1
Ovenbird	0	0	2	1	2	2	1	1	0	0	0	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	1	1	1	1	1	0	0	0	0	1	1	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	1
Eastern Towhee	1	0	0	0	0	0	0	0	0	0	0	0
Chipping Sparrow	2	1	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	1	2	0	1	0	1	0	0	0	1	0	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	0	0	0	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	1	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	1	0	0	1	0	0	0	1	0	0
Eastern Meadowlark	0	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	1	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	1	0	0	0	2	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 44 Forest	Station 46 Grassland	Station 47 Grassland	Station 49 E.S. Edge	Station 50 E.S. Edge	Station 51 Forest	Station 53 Grassland	Station 55 Developed	Station 58 E.S. Edge	Station 60 Forest	Station 63 Grassland	Station 64 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	1	0	1	0	1	0	0	0	0	0	0	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	1	0	0	0	0	0	0
Hairy Woodpecker	0	1	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	1	0	0
Eastern Wood-Pewee	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	1	0	0	0	0
Great Crested Flycatcher	0	1	0	0	1	1	1	0	0	0	0	0
Eastern Kingbird	0	0	0	1	0	0	0	0	0	0	2	0
Yellow-throated Vireo	0	0	0	0	0	0	1	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	1	0	1	0	0	0	0
Blue Jay	0	1	0	0	1	0	1	0	0	0	1	0
American Crow	1	1	1	1	1	1	0	0	0	2	1	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	1	0	0	0	3	1	0	2
Eastern Tufted Titmouse	0	0	0	0	1	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	1	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	1	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	2	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 44	Station 46	Station 47	Station 49	Station 50	Station 51	Station 53	Station 55	Station 58	Station 60	Station 63	Station 64
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	1	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	0	0	0	0	0	0	0	0	0	0
American Robin	0	0	0	2	2	0	0	0	0	0	1	0
Gray Catbird	0	0	0	0	1	0	0	0	0	2	0	0
European Starling	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	1	0	3	2	0	1	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	2	0	1	1
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	1	0	0	0	1	1
Black-and-White Warbler	0	1	0	0	0	0	0	0	0	0	1	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	2	0	0	0	0	2	0	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	1	0	1	0	1	0	2	2	1	0	1	2
Scarlet Tanager	0	0	0	0	1	1	0	0	0	0	0	0
Eastern Towhee	2	0	0	0	0	0	0	0	0	1	1	0
Chipping Sparrow	0	0	0	1	0	0	0	0	0	0	0	0
Field Sparrow	1	0	1	2	1	0	0	0	0	1	1	1
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	2	3	2	3	1	0	1	2	0	1	3
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	1	1	0	0	0	0	0	0	2	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	1	0	0	0	0	0	0	0	0
Bobolink	0	4	5	0	0	0	0	0	0	0	2	1
Red-winged Blackbird	1	0	2	0	0	0	3	0	2	0	0	0
Eastern Meadowlark	0	1	1	3	1	0	0	0	0	0	1	1
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	1	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	1	0	0	0
American Goldfinch	0	1	1	1	1	3	1	0	0	1	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 65 E.S. Edge	Station 66 E.S. Edge	Station 68 Forest	Station 69 Grassland	Station 70 Wet. Forest	Station 71 Forest	Station 74 E.S. Edge	Station 75 E.S. Edge	Station 76 E.S. Edge	Station 80 Ag Field	Station 83 Ag Field	Station 85 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	1	0	0	0	0	0	0	0	0	0	1	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	1	0	0	0	0	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	1	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	1	1	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	1	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0	0	0	1	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0	0	0	0	1	0	0
Blue Jay	1	0	1	1	1	1	0	0	1	0	0	1
American Crow	0	0	1	0	1	0	0	0	0	0	1	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	2	0	0	1	0	0	0	0	0	0
Eastern Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
House Wren	1	0	1	0	1	1	0	0	1	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 65	Station 66	Station 68	Station 69	Station 70	Station 71	Station 74	Station 75	Station 76	Station 80	Station 83	Station 85
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	0	0	0	0	0	0	0	0	0	0
American Robin	0	0	0	0	0	0	0	0	2	1	2	0
Gray Catbird	0	1	0	0	1	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0	0	0	4	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	1	0	0	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	2	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	1	0	0	0	1	0	1	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	1	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	0	1	1	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	1	1	1	1	1	2	1	1	1	1	1	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	2	1	1	1	0	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	1	0	0
Field Sparrow	0	0	1	1	1	0	0	0	1	0	0	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	1	1	2	2	2	0	1	2	2	2	1	1
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	0	0	0	0	0	0	1
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	2	0	0	2	5	0	0	0	0
Red-winged Blackbird	1	0	0	0	0	0	0	2	2	0	0	5
Eastern Meadowlark	0	0	0	0	0	0	0	1	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	1
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	1	1	1	0	0	1	1	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 86 F. Stream	Station 89 Developed	Station 90 Forest	Station 92 E.S. Edge	Station 93 Forest	Station 94 E.S. Edge	Station 96 E.S. Edge	Station 98 E.S. Edge	Station 99 E.S. Edge	Station 100 Wet Field	Station 101 Wet. Forest	Station 102 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	10	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	1	1	0	0	0	0	0	0	0	1	1	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	1	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	1	0	0	0	0	0	0	1	1	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	1
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	1	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	1	0	1	0	0	0	0
Blue Jay	1	0	0	0	1	1	1	1	1	0	0	0
American Crow	0	0	1	2	2	1	1	0	0	1	0	1
Tree Swallow	1	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	1	0	0	1	0	0	0	0
Eastern Tufted Titmouse	0	0	0	0	1	0	1	0	0	1	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 86	Station 89	Station 90	Station 92	Station 93	Station 94	Station 96	Station 98	Station 99	Station 100	Station 101	Station 102
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	2	0	0	0
Wood Thrush	1	0	0	0	0	1	0	1	0	1	3	0
American Robin	0	0	0	0	1	0	0	0	1	1	0	1
Gray Catbird	1	0	0	1	1	0	0	0	1	0	1	1
European Starling	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	0	0	0	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	1	0	0	0	0	0	1	0	0	0	2
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	1	0	0	1	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	1	0	1	0	0	2	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	1	0	0	0	1	2	0	0	0	1	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	1	0	0	1	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	1	0	0	4	0	0	0	0	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	1	3	1	3	0	1	1	0	0	1	1	2
Swamp Sparrow	0	0	0	0	0	0	0	0	0	2	0	0
Northern Cardinal	0	0	0	0	0	0	0	0	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	1	0	0	0	0
Indigo Bunting	0	0	0	0	0	1	2	1	0	0	0	0
Bobolink	0	0	0	12	0	0	0	0	0	0	0	1
Red-winged Blackbird	1	3	0	4	0	0	0	0	0	5	1	0
Eastern Meadowlark	0	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	1	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	1	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	1	1	0	0	2	1	0	0	0	0	1

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 103 E.S. Edge	Station 104 Grassland	Station 105 Grassland	Station 108 Wet Field	Station 109 E.S. Edge	Station 113 Ag Field	Station 114 E.S. Edge	Station 115 F. Stream	Station 116 F. Stream	Station 117 Forest	Station 119 E.S. Edge	Station 123 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	1	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	1	0	0	0	0	0
Mourning Dove	1	1	0	2	1	2	1	0	0	0	0	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	1	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	0	0	1
Pileated Woodpecker	0	1	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0	0	1	1	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	1	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	1	0	1
Eastern Kingbird	0	0	0	1	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0	0	1	1	0	0	0
Blue Jay	0	0	1	0	1	0	0	1	1	1	0	1
American Crow	0	0	1	0	0	0	0	0	0	0	0	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	1	0	1	0	0	0	0	2	0	0
Eastern Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	1
White-breasted Nuthatch	0	0	1	0	0	0	0	0	0	0	0	0
House Wren	1	0	1	0	1	0	0	0	0	0	0	0
Eastern Bluebird	2	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 103	Station 104	Station 105	Station 108	Station 109	Station 113	Station 114	Station 115	Station 116	Station 117	Station 119	Station 123
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	0	0	0	0	0	0	0	0	0	1
American Robin	2	0	1	0	0	1	1	1	0	0	0	0
Gray Catbird	1	0	0	0	1	0	0	0	0	0	0	1
European Starling	0	0	0	0	0	1	1	0	0	0	0	0
Cedar Waxwing	0	0	1	0	0	2	2	0	0	0	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	1	0	1	0	0	0	1	1
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	1	1	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	1	0	0	0	0	0	1	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	0	0	0	1	1	1	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	1	1	1	1	1	0	0	0	0	0	0	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	0	1	0	0	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0	1	0	0	0	0	0
Field Sparrow	0	0	0	1	1	0	0	0	0	0	0	2
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	1	0	1	2	1	1	1	0	0	0	4	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	1	0	0	0	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	1	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	1	0	0	0	1
Bobolink	0	5	6	1	0	0	0	0	0	0	4	0
Red-winged Blackbird	2	3	2	2	0	2	1	0	0	0	1	0
Eastern Meadowlark	0	3	2	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	1	2	0	1	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 125 Developed	Station 128 Ag Field	Station 130 Grassland	Station 131 E.S. Edge	Station 132 Forest	Station 133 Grassland	Station 137 Forest	Station 138 E.S. Edge	Station 139 E.S. Edge	Station 141 Ag Field	Station 143 Ag Field	Station 144 Wet Field
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	1	0	0	0	0	0	0	0	0	0	1	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	1	0	0	0	0
Pileated Woodpecker	0	0	0	0	1	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	1	0	0	1	0	0	0	0	0	0	1
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0	0	0	2	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	1	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	1	0	0	1	0	2	0	0	0	0	0
Blue Jay	0	0	0	0	3	0	0	0	1	0	0	0
American Crow	0	0	1	0	0	1	0	1	1	1	0	0
Tree Swallow	0	0	14	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0	1	0	0	0	0	0
Eastern Tufted Titmouse	0	0	0	1	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 125	Station 128	Station 130	Station 131	Station 132	Station 133	Station 137	Station 138	Station 139	Station 141	Station 143	Station 144
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	2	0	0	1	1	0	0	0	0
Wood Thrush	0	0	0	0	1	0	0	0	0	0	1	0
American Robin	0	3	5	0	0	0	2	0	0	0	0	1
Gray Catbird	2	0	0	0	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	2	0	0	0	0	0	0	0	0	0	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	3	0	0	0	0	0	0	0	0	1	1	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	1	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	0	2	1	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	1	0	1	0	1	0	1	2	0	2	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	0	0	0	0	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	1	0	1	0	0
Field Sparrow	0	0	0	1	0	0	0	1	1	0	0	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	2	0	0
Song Sparrow	1	2	0	0	2	2	0	2	1	1	1	2
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	1	0	0	0	0	0	0	1
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	1	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	1	1	3	0	0	0	0	3	0	2	2	0
Eastern Meadowlark	0	0	0	1	0	3	0	0	0	0	0	0
Common Grackle	1	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	1	1	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	1	0	0	1	1	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 147 E.S. Edge	Station 148 Forest	Station 150 F. Stream	Station 151 E.S. Edge	Station 152 F. Stream	Station 153 E.S. Edge	Station 154 E.S. Edge	Station 155 E.S. Edge	Station 157 E.S. Edge	Station 161 Grassland	Station 162 Grassland	Station 165 Ag Field
Canada Goose	0	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	1	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	1	0	0	0
Ruby-throated Hummingbird	0	0	0	0	1	0	0	0	0	0	0	0
Belted Kingfisher	0	0	1	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	1	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	0	1	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	1	1	0	1	0	0	0	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	1	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	1	1	0	0	0
Eastern Kingbird	0	0	0	0	0	0	0	0	0	2	1	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	1	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	2	1	2	0	0	0	0	2
Blue Jay	0	1	0	0	1	2	0	1	0	1	1	0
American Crow	0	0	0	0	0	0	0	0	0	2	0	0
Tree Swallow	0	0	0	0	0	2	0	1	0	0	0	0
Black-capped Chickadee	0	0	1	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	2	0	1	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 147	Station 148	Station 150	Station 151	Station 152	Station 153	Station 154	Station 155	Station 157	Station 161	Station 162	Station 165
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	1	0	0	1	0	0	0	0	0	0
Wood Thrush	0	0	0	1	0	0	0	0	0	0	0	0
American Robin	3	0	0	0	0	1	0	2	1	1	1	2
Gray Catbird	0	0	0	0	0	0	0	0	0	0	0	0
European Starling	4	0	0	0	0	1	0	0	0	2	0	0
Cedar Waxwing	0	0	0	0	0	0	0	0	0	0	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	1	0	3	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	1	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	1	0	1	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	0	2	2	0	0	0	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	1	0	0	0	1	0	1	0	1	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	0	0	0	0	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	1	0	1	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	1	1	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	1	0	0	1	0	1	0	3	2
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	0	0	1	0	1	0	0
Rose-breasted Grosbeak	0	0	1	1	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0	0	0	1	0	1	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	3	1	1	1
Eastern Meadowlark	0	0	0	0	0	2	1	2	1	2	1	0
Common Grackle	0	0	1	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	1	0	0	0	0	0	0	0	0	0	3	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	1	0	1	0	0	0	1	2	1	0	1	1

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 167 E.S. Edge	Station 169 Grassland	Station 170 Grassland	Station 171 Forest	Station 177 Wet Field	Station 181 Forest	Station 182 Forest	Station 183 Forest	Station 184 Forest	Station 186 Forest	Station 188 Forest	Station 189 Forest
Canada Goose	0	0	0	0	0	0	0	0	0	0	1	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	1	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	1	0	0	0	1	0	0	0	1	0	0	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	1	1	1	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	1	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	1	0	0
Eastern Wood-Pewee	0	0	0	0	0	0	1	1	2	2	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	1	0	0	1	1	0	0	1	0	0
Eastern Kingbird	1	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	1	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	0	0	0	0	1	0	0	0
Blue Jay	0	0	1	1	2	0	0	0	0	0	0	0
American Crow	1	0	0	0	0	0	0	1	0	0	1	0
Tree Swallow	0	1	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	2	1	0	0	1	0	3
Eastern Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0	1

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 167	Station 169	Station 170	Station 171	Station 177	Station 181	Station 182	Station 183	Station 184	Station 186	Station 188	Station 189
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	2	0	1	1	1	0	1	0	1
Wood Thrush	0	0	1	0	0	0	0	0	0	0	0	0
American Robin	0	0	0	0	0	0	2	0	0	1	1	1
Gray Catbird	0	0	0	0	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	1	2	0	0	1	0	0
Cedar Waxwing	0	0	0	0	2	0	0	0	0	0	0	3
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	1	0	0	0	0	0	1	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	1	1	0	0	1	0	0	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	1	0	0
Common Yellowthroat	0	0	0	1	2	0	0	0	0	0	0	2
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	0	2	0	0	0	0	0	0	1
Chipping Sparrow	4	0	1	0	0	0	0	0	0	0	0	0
Field Sparrow	2	1	1	0	0	0	0	0	0	0	1	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	1	1	0	0	2	0	0	0	0	0	1	0
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	2	0	0	0	0	0	1	0
Rose-breasted Grosbeak	0	0	1	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	1	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	3	1	0	1	0	0	0	16	1	0	0
Eastern Meadowlark	1	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	1	0	0	0	0	0	0
Baltimore Oriole	0	1	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	2	0	0	0	0	0	0	0	0	0	1	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 192 F. Stream	Station 193 E.S. Edge	Station 195 F. Stream	Station 196 E.S. Edge	Station 197 Forest	Station 198 Forest	Station 200 Grassland	Station 201 Grassland	Station 202 E.S. Edge	Station 203 E.S. Edge	Station 204 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	1	0	0	0	0	0	0	0
Ruby-throated	0	0	0	0	0	0	0	0	0	0	0
Hummingbird											
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	1	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern	0	0	0	0	0	0	0	0	1	2	0
Flicker											
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	2	0	0	0	1	0	0	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	0	0	0
Alder Flycatcher	0	0	0	0	0	0	1	0	0	0	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	1	1
Eastern Kingbird	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	1	1	1	0	0	0	0	0	0
Blue Jay	0	0	0	0	0	0	0	0	1	0	0
American Crow	0	0	0	0	0	1	1	0	0	0	2
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	1	0	0	1	0	0
Eastern Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 192	Station 193	Station 195	Station 196	Station 197	Station 198	Station 200	Station 201	Station 202	Station 203	Station 204
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	1	0	0	1	0	0	0	0	0	0	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	2	0	0	0	0	0	0	0
Wood Thrush	3	0	1	0	2	3	0	0	0	0	0
American Robin	0	1	0	5	2	0	1	0	0	0	0
Gray Catbird	0	0	0	0	0	0	0	0	0	0	2
European Starling	0	0	0	0	0	0	0	0	0	0	3
Cedar Waxwing	0	0	1	0	0	0	0	0	0	0	0
Nashville Warbler	0	0	0	0	0	0	0	0	0	1	0
Yellow Warbler	0	0	0	0	0	0	1	0	0	1	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	1	0	0	1	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	1	0	0	0	1	1	0	0	0	1	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	1	0	0	0	1	0	1	0	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	0	0	0	0	2	0	0	0	0	1
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	1	1	0
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	2	2	2	1	1
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	0	0	0	0	1	0
Rose-breasted Grosbeak	0	1	0	0	0	1	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0	2	2	0	0	1
Red-winged Blackbird	0	0	0	0	0	0	0	2	0	1	0
Eastern Meadowlark	0	0	0	0	0	0	2	2	0	0	1

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 192	Station 193	Station 195	Station 196	Station 197	Station 198	Station 200	Station 201	Station 202	Station 203	Station 204
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	2	1	0	0	1	0	1	1	0	1

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 206 Forest	Station 207 Grassland	Station 208 E.S. Edge	Station 209 E.S. Edge	Station 211 Forest	Station 212 Ag Field	Station 213 E.S. Edge	Station 214 Grassland	Station 215 Forest	Station 219 Forest	Station 220 E.S. Edge
Canada Goose	0	0	0	0	0	0	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	0	0	0
Mallard	0	0	0	0	0	0	0	0	0	0	0
American Kestrel	0	0	0	0	0	0	0	0	0	0	0
Killdeer	0	0	0	0	0	0	0	0	0	0	0
Rock Dove	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	1	0	0	0	0	0	1	1	0	0	0
Ruby-throated Hummingbird	0	0	0	0	0	0	0	0	0	0	0
Belted Kingfisher	0	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	1	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	1	0	0	0	0	0	0	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0	0	0	0	0	1	0	0
Alder Flycatcher	0	0	1	1	0	0	0	0	0	0	1
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Kingbird	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	1	0	0	0	1	0	0	0	0	1	0
Blue Jay	2	0	0	0	0	0	0	1	1	1	0
American Crow	1	0	0	0	0	0	0	1	0	1	0
Tree Swallow	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	1	0	0	1	0	1
Eastern Tufted Titmouse	0	0	0	0	0	0	0	0	0	0	0
Red-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	1	0	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 206	Station 207	Station 208	Station 209	Station 211	Station 212	Station 213	Station 214	Station 215	Station 219	Station 220
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	1	0	0	2	0	0	0	0	1	0
Wood Thrush	0	0	0	0	0	1	0	0	0	0	0
American Robin	0	0	0	0	1	0	0	0	1	3	0
Gray Catbird	0	1	0	0	0	0	1	0	0	1	0
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	1	0	0	0	0	0	0	1
Nashville Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	2	1	0	1	1	1	0	0	0	1
Chestnut-sided Warbler	0	0	1	0	0	0	0	0	0	0	0
Pine Warbler	0	0	0	0	0	0	0	0	0	0	0
Prairie Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	1	1	0	1	1	0	0	0	1
American Redstart	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	1	0	0	0	1	1	0	0	1	0	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	3	0	1	0	2	0	0	0	1	1
Scarlet Tanager	0	0	0	0	0	0	0	0	0	0	0
Eastern Towhee	0	1	0	0	0	0	0	1	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	1	0	0	0	1
Savannah Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	2	1	3	0	2	2	2	0	0	3
Swamp Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	3	1	1	0	0	2
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0
Bobolink	0	0	0	0	0	0	0	1	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Eastern Meadowlark	0	0	0	0	0	0	0	1	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	1	0	0	1	0	0	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 206	Station 207	Station 208	Station 209	Station 211	Station 212	Station 213	Station 214	Station 215	Station 219	Station 220
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0
Purple Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	1	1	0	1	0	0	0	0	0	2

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 222 E.S. Edge	Station 224 Developed	Station 236 Forest	Station 240 Forest
Canada Goose	0	0	0	0
Wood Duck	0	0	0	0
Mallard	0	0	0	0
American Kestrel	0	0	0	0
Killdeer	0	0	0	0
Rock Dove	0	0	0	0
Mourning Dove	0	1	0	0
Ruby-throated Hummingbird	0	0	0	0
Belted Kingfisher	0	0	0	0
Yellow-bellied Sapsucker	0	0	0	0
Downy Woodpecker	0	0	0	0
Hairy Woodpecker	0	0	0	1
Yellow-shafted Northern Flicker	0	1	0	0
Pileated Woodpecker	0	0	0	0
Eastern Wood-Pewee	0	0	0	0
Yellow-bellied Flycatcher	0	0	0	0
Alder Flycatcher	0	0	0	0
Eastern Phoebe	0	0	0	0
Great Crested Flycatcher	0	0	0	0
Eastern Kingbird	0	0	1	0
Yellow-throated Vireo	0	0	0	0
Blue-headed Vireo	0	0	0	0
Warbling Vireo	0	0	0	0
Red-eyed Vireo	0	0	1	0
Blue Jay	1	2	0	0
American Crow	0	0	0	0
Tree Swallow	0	0	0	0
Black-capped Chickadee	0	1	0	0
Eastern Tufted Titmouse	0	0	1	0
Red-breasted Nuthatch	0	0	0	0
White-breasted Nuthatch	0	1	0	1
House Wren	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 222	Station 224	Station 236	Station 240
Eastern Bluebird	0	0	0	0
Veery	0	1	0	0
Swainson's Thrush	0	0	0	0
Hermit Thrush	0	0	0	0
Wood Thrush	0	0	0	1
American Robin	0	1	0	0
Gray Catbird	0	0	0	0
European Starling	0	1	0	0
Cedar Waxwing	0	0	0	0
Nashville Warbler	0	0	0	0
Yellow Warbler	1	0	0	0
Chestnut-sided Warbler	0	0	0	0
Pine Warbler	0	0	0	0
Prairie Warbler	0	0	0	0
Black-and-White Warbler	1	0	0	0
American Redstart	0	0	0	0
Ovenbird	0	0	0	1
Louisiana Waterthrush	0	2	0	0
Common Yellowthroat	1	0	2	0
Scarlet Tanager	0	0	0	0
Eastern Towhee	0	0	0	0
Chipping Sparrow	0	0	0	0
Field Sparrow	0	0	0	0
Savannah Sparrow	0	0	0	0
Song Sparrow	0	2	0	1
Swamp Sparrow	0	0	0	0
Northern Cardinal	0	0	0	1
Rose-breasted Grosbeak	0	0	0	0
Indigo Bunting	0	0	0	0
Bobolink	0	0	0	0
Red-winged Blackbird	0	0	0	0
Eastern Meadowlark	0	0	0	0
Common Grackle	0	0	0	0
Brown-headed Cowbird	0	0	0	0

Appendix 7-A. Total number of birds detected at each point count stations in Saratoga National Historical Park in 2002 and 2003 (continued).

Species	Station 222	Station 224	Station 236	Station 240
Baltimore Oriole	0	0	0	0
Purple Finch	0	0	0	0
American Goldfinch	1	1	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003.

Species	Station 1	Station 2	Station 3	Station 5	Station 6	Station 7	Station 8	Station 9	Station 10	Station 11	Station 12
	N=1	N=1	N=1	N=1	N=1	N=1	N=1	N=1	N=1	N=1	N=1
	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest	D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	0	3	2	2	3	0	0	0	1	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	1	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	1	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	1	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	1	0	0	0	0
Eastern Wood-Pewee	0	0	0	0	0	0	0	0	1	1	2
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	1	1	1	0
Yellow-throated Vireo	0	0	0	0	1	0	0	1	0	0	0
Red-eyed Vireo	2	2	2	2	2	0	0	0	1	2	1
Blue Jay	2	2	0	2	1	0	0	0	0	2	0
American Crow	1	0	0	0	0	0	1	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	0	0	1	0	1	0	3	0	3	0
White-breasted Nuthatch	0	0	0	0	1	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	1	1	0
Swainson's Thrush	4	10	1	0	0	0	0	0	0	0	0
Hermit Thrush	0	1	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	0	0	0	1	1	2	1	0	0
American Robin	0	2	0	0	0	0	6	0	0	0	0
Gray Catbird	0	0	0	0	3	0	2	2	1	2	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 1	Station 2	Station 3	Station 5	Station 6	Station 7	Station 8	Station 9	Station 10	Station 11	Station 12
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0
European Starling	2	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	50	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	1	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	1	4	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	1	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	3	1	0	0	1	0	0	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	2	0	0	0	0	0	0	1	1	1	1
Worm-eating Warbler	0	0	0	0	0	1	0	0	0	0	0
Ovenbird	1	0	0	0	3	1	0	2	2	0	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	0	1	0	1	0	0	0	2	1
Eastern Towhee	0	0	0	0	0	0	2	0	1	1	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	1	0	0	1	0	0	0	0
Northern Cardinal	0	1	0	3	0	0	0	0	0	2	0
Rose-breasted Grosbeak	0	0	0	0	1	0	0	1	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	2	0	0	0	0
Baltimore Oriole	0	0	0	1	0	0	5	0	1	0	1
House Finch	0	0	0	2	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 1	Station 2	Station 3	Station 5	Station 6	Station 7	Station 8	Station 9	Station 10	Station 11	Station 12
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	1	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 13 D. Forest	Station 14 D. Forest	Station 15 D. Forest	Station 16 D. Forest	Station 17 D. Forest	Station 18 D. Forest	Station 19 D. Forest	Station 20 F. Wetland	Station 21 D. Forest	Station 22 D. Forest	Station 23 D. Forest
Red-tailed Hawk	0	0	0	0	1	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	1	0	0	0	0	0	0
Red-bellied Woodpecker	1	1	0	0	3	0	1	0	1	1	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	1	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	1	1	1	1	1	1	0	0	1	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	2	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	1	0	0	0	0	0	0
Red-eyed Vireo	3	0	0	0	0	1	1	0	2	1	3
Blue Jay	2	1	1	1	0	0	0	1	0	0	1
American Crow	0	0	2	0	0	0	0	0	0	0	1
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	2	4	1	0	1	1	0	4	0	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	2	0	0	0	0	0	0
Veery	2	1	1	0	0	1	0	0	0	1	1
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	2	1	4	1	0	0	3	0	1	1	2
American Robin	0	0	0	0	0	0	0	1	0	1	1
Gray Catbird	2	0	0	0	0	0	0	0	2	1	1

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 13	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21	Station 22	Station 23
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	2	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	1	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0	0	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	1	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	1	0	2	0
Worm-eating Warbler	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	1	0	2	0	0	1	0	1	1	1	2
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	3	0	0	0	1	0	0	0	2
Eastern Towhee	1	0	0	0	0	0	0	2	0	0	0
Chipping Sparrow	0	0	0	0	1	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	1	0	0	3	0	1	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	1	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	10	0	0	1	0	0	0
Baltimore Oriole	0	1	0	1	0	0	1	1	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 13	Station 14	Station 15	Station 16	Station 17	Station 18	Station 19	Station 20	Station 21	Station 22	Station 23
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	1	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 24 F. Wetland	Station 25 D. Forest	Station 26 Edge	Station 27 D. Forest	Station 28 D. Forest	Station 29 D. Forest	Station 30 D. Forest	Station 31 D. Forest	Station 32 D. Forest	Station 33 D. Forest	Station 34 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	0	3	1	2	0	0	1	0	1	3	1
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	1	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	1	0	1	0	1	0	2	0	0	0
Pileated Woodpecker	0	0	1	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	1	1	0	0	1	2	1	0	2	0	2
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	1	0	0	1	0	0	0	0	0
Yellow-throated Vireo	0	1	0	0	0	1	0	0	0	1	0
Red-eyed Vireo	1	0	1	1	1	3	0	2	1	0	1
Blue Jay	0	1	1	1	0	0	0	0	0	2	1
American Crow	0	0	0	0	0	0	0	0	0	0	0
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	0	1	1	2	5	0	0	0	1	2
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	1	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	1	0	0	0	0	0	0	0
Veery	0	1	0	0	0	0	0	0	0	0	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	1	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	0	0	1	1	0	4	1	2	1	2	0
American Robin	0	1	0	2	0	0	1	2	0	1	0
Gray Catbird	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 24	Station 25	Station 26	Station 27	Station 28	Station 29	Station 30	Station 31	Station 32	Station 33	Station 34
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	25	1	0	1	0	0	0	0	5	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	1	1	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	1	0	1	0	0	0	0	0	0	0
American Redstart	1	0	0	0	0	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	1	0	0	0	0	2	2	0	1	2	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	1	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	0	0	0	1	0	2	0	0	0
Eastern Towhee	1	4	0	0	1	0	0	0	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	1	0	0	0	0	0	2	0	1	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	1	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	1	1	0	0	0	0	0	1	0	0
Baltimore Oriole	0	0	1	0	0	2	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 24	Station 25	Station 26	Station 27	Station 28	Station 29	Station 30	Station 31	Station 32	Station 33	Station 34
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 35 D. Forest	Station 36 Stream	Station 37 D. Forest	Station 38 D. Forest	Station 39 D. Forest	Station 40 D. Forest	Station 41 D. Forest	Station 42 D. Forest	Station 43 D. Forest	Station 44 D. Forest	Station 45 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	1	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	3	0	3	1	1	0	3	0	1	0	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	1	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	1	0	0	0	0	0	1	0	0	0
Yellow-shafted Northern Flicker	1	0	1	0	0	1	0	1	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	2	1	0	0	0	0	0	2	0	1	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	1	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	2	1	0	1	0	0	0	0	1	3	1
Blue Jay	3	0	1	0	0	1	2	2	1	1	1
American Crow	1	0	0	0	0	1	0	2	0	0	0
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	2	0	1	0	0	2	2	3	0	0	0
White-breasted Nuthatch	0	0	0	1	0	1	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	0	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	2	1	1	3	0	3	0	1	0	3	0
American Robin	0	0	2	3	0	0	0	0	0	0	0
Gray Catbird	0	0	1	0	0	0	2	0	0	0	0
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 35	Station 36	Station 37	Station 38	Station 39	Station 40	Station 41	Station 42	Station 43	Station 44	Station 45
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	40	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0	0	1	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	1	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	1	0	0	1	0	0	0	0	0	3	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	0	0	0	1	0	0	0	2	1
Eastern Towhee	0	0	0	0	0	1	1	0	1	0	0
Chipping Sparrow	0	0	0	0	0	0	1	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	1	0	0	2	0	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	1	0
Indigo Bunting	0	0	0	0	0	0	1	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	1	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	1	3	0	0	0
Baltimore Oriole	0	0	0	1	0	0	1	0	0	0	0
House Finch	0	0	0	0	0	0	2	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 35	Station 36	Station 37	Station 38	Station 39	Station 40	Station 41	Station 42	Station 43	Station 44	Station 45
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 46 D. Forest	Station 47 F. Wetland	Station 48 D. Forest	Station 49 D. Forest	Station 50 D. Forest	Station 51 D. Forest	Station 52 D. Forest	Station 53 Edge	Station 54 D. Forest	Station 55 D. Forest	Station 56 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	1	2	2	1	0	0	0	1	0	1	1
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	1	0	0
Downy Woodpecker	0	0	1	0	0	0	2	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	1	0	0	2	0	1	2	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	1	0
Eastern Wood-Pewee	0	0	0	1	0	1	1	0	0	1	0
Eastern Phoebe	0	0	0	0	0	0	1	0	1	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	1	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	1	0	0
Red-eyed Vireo	1	0	3	0	3	0	3	0	3	1	2
Blue Jay	0	1	0	0	1	2	3	1	0	0	2
American Crow	0	0	0	0	0	0	0	0	0	0	1
Black-capped Chickadee	0	1	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	1	1	0	0	0	1	5	0	0	0	2
White-breasted Nuthatch	0	0	0	0	0	2	1	0	0	1	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	0	0	0	0	2	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	1	1	2	1	3	1	2	0	3	0	1
American Robin	1	0	0	0	0	0	0	2	0	0	1
Gray Catbird	1	0	0	0	0	0	0	0	0	1	0
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 46	Station 47	Station 48	Station 49	Station 50	Station 51	Station 52	Station 53	Station 54	Station 55	Station 56
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	1	0	0	15	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	1	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	1	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0	0	0	0	0	0
Cerulean Warbler	0	0	0	0	1	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	1	0	0	0	1	0	0
American Redstart	0	0	0	0	0	2	0	0	3	0	0
Worm-eating Warbler	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	3	0	1	0	2	0	0
Louisiana Waterthrush	0	0	1	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	2	0	1	0	3	0	2	0	0
Eastern Towhee	0	0	2	1	0	1	0	1	0	0	0
Chipping Sparrow	0	0	0	0	0	0	0	1	1	0	1
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	0	0	1	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	1	0	1	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	1	0	1
Baltimore Oriole	0	0	0	1	0	0	2	0	1	0	1
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 46	Station 47	Station 48	Station 49	Station 50	Station 51	Station 52	Station 53	Station 54	Station 55	Station 56
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 57 D. Forest	Station 58 F. Wetland	Station 59 D. Forest	Station 60 D. Forest	Station 61 Edge	Station 62 D. Forest	Station 63 Edge	Station 64 D. Forest	Station 65 D. Forest	Station 66 D. Forest	Station 67 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	1	2	0	2	0	2	0	0	0	0	2
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	1	0	0	1	0	1	0	0	0	1	0
Hairy Woodpecker	0	0	0	0	0	0	0	1	0	0	0
Yellow-shafted Northern Flicker	0	1	0	1	0	0	0	2	0	2	1
Pileated Woodpecker	0	0	1	0	0	0	0	1	0	0	0
Eastern Wood-Pewee	0	0	0	1	1	0	0	0	1	1	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	2	0	1	0	0	0	0	3
Blue Jay	0	2	1	2	1	1	0	2	0	4	3
American Crow	0	1	0	0	0	0	0	0	0	1	0
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	0	1	0	0	3	0	2	0	4	3
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	1	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	1	0	0	0	0	0	0	0	0	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	1	3	1	2	1	2	0	2	3	2	3
American Robin	1	0	1	0	0	0	4	0	2	0	1
Gray Catbird	0	2	0	0	1	2	0	2	0	3	0
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 57	Station 58	Station 59	Station 60	Station 61	Station 62	Station 63	Station 64	Station 65	Station 66	Station 67
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	30	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	1	0	0	0	1	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	1	0	0	0	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0	0	1	0	0	0
Ovenbird	1	1	1	1	0	0	0	0	0	2	2
Louisiana Waterthrush	0	1	0	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	2	0	1	0	0	1	0	0	0	0	1
Eastern Towhee	0	0	0	0	0	1	0	2	0	2	0
Chipping Sparrow	0	0	0	0	0	0	1	0	0	0	0
Field Sparrow	0	0	0	0	0	1	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	1	0	0	0	0	0	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	1	0	0	0
Indigo Bunting	0	0	0	0	1	0	1	1	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	1	0	0	2	0	1	0
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 57	Station 58	Station 59	Station 60	Station 61	Station 62	Station 63	Station 64	Station 65	Station 66	Station 67
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 68 D. Forest	Station 69 F. Wetland	Station 70 D. Forest	Station 71 D. Forest	Station 72 D. Forest	Station 73 D. Forest	Station 74 D. Forest	Station 75 D. Forest	Station 76 D. Forest	Station 77 D. Forest	Station 78 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	1	0	1	0	0	0	2	0	3	1	2
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	1	0	0	0	0	0	1	0	1	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	1	1	1	1	0	1	1	0	1
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	1	0	1	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	0	0	0	0
Red-eyed Vireo	0	0	0	0	1	0	0	1	2	1	0
Blue Jay	1	1	1	1	0	0	0	1	2	0	1
American Crow	0	0	0	0	0	0	2	0	0	0	1
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	1	0	2	0	4	0	3	0	0	0	3
White-breasted Nuthatch	0	0	0	1	0	0	0	0	0	1	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	1	0	0	0	0	0	0	2	0
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	2	1	2	2	2	2	2	1	1	1	2
American Robin	0	0	0	0	1	0	1	0	0	0	0
Gray Catbird	0	0	0	0	3	0	1	0	0	0	0
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 68	Station 69	Station 70	Station 71	Station 72	Station 73	Station 74	Station 75	Station 76	Station 77	Station 78
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	0	0	0	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	0	0	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	1	0	0	1	2	3	1	0	1
Louisiana Waterthrush	0	0	1	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	0	0	1	1	0	0	0	0	2
Eastern Towhee	0	0	0	0	0	0	0	0	1	1	0
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	0	0	0	0	0	1	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	0	0	0	0	0	0	1
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	1
Red-winged Blackbird	0	0	0	0	1	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	1	0	0	0	0	0	0
Baltimore Oriole	0	0	0	0	1	0	0	0	0	0	0
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 68	Station 69	Station 70	Station 71	Station 72	Station 73	Station 74	Station 75	Station 76	Station 77	Station 78
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 79 D. Forest	Station 80 D. Forest	Station 81 Edge	Station 82 D. Forest	Station 83 F. Wetland	Station 84 D. Stream	Station 85 D. Forest	Station 86 Edge	Station 87 D. Forest	Station 88 D. Stream	Station 89 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	1	0	0	0	0	0
Mourning Dove	1	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	0	2	0	1	0	2	0	0	0	2	0
Yellow-bellied Sapsucker	0	1	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	1	0	0	1	0	0	0	1
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	1	0	0	1	1	1	0	0	2	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	1	1	1	1	0	0	0	0	1	1	0
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	1	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	1	0	0	0	0	0	0	0
Red-eyed Vireo	0	1	0	1	0	1	0	0	2	0	1
Blue Jay	1	1	0	0	0	1	1	0	0	1	0
American Crow	0	0	0	0	0	0	0	6	0	0	0
Black-capped Chickadee	0	0	1	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	1	1	1	0	2	0	0	0	1	0
White-breasted Nuthatch	0	1	0	1	0	2	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	0	0	0	0	0	1	1	0	0	0	0
Swainson's Thrush	0	0	0	1	0	1	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	1	0	0	1	0	2	0	1	0	3	2
American Robin	0	1	0	1	0	0	5	4	1	0	0
Gray Catbird	0	0	0	0	0	0	0	3	0	0	1
Northern Mockingbird	0	0	1	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 79	Station 80	Station 81	Station 82	Station 83	Station 84	Station 85	Station 86	Station 87	Station 88	Station 89
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	5	0	31	0	0	0	0	0	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	0	0	0	1	0	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	0	0	0	0	0	0	0
American Redstart	0	0	0	0	0	0	0	0	1	0	0
Worm-eating Warbler	0	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0	0	0	1	0	0	0	3	1
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	1	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	0	0	0	0	0	0	0	1	1
Eastern Towhee	1	1	1	0	0	0	0	2	0	0	0
Chipping Sparrow	0	0	1	0	0	0	0	1	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	2	0	0	0
Northern Cardinal	0	0	0	0	0	0	1	0	0	0	0
Rose-breasted Grosbeak	0	0	0	1	0	1	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	1	0
Brown-headed Cowbird	0	0	0	1	0	1	0	3	0	0	1
Baltimore Oriole	1	1	0	1	0	0	1	2	0	0	0
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 79	Station 80	Station 81	Station 82	Station 83	Station 84	Station 85	Station 86	Station 87	Station 88	Station 89
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 90 D. Forest	Station 91 D. Forest	Station 92 Edge	Station 93 D. Forest	Station 94 D. Forest	Station 95 D. Forest	Station 96 D. Forest	Station 97 D. Forest	Station 99 D. Forest	Station 100 D. Forest	Station 101 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	1	0	0	0	0
Wild Turkey	0	1	0	0	0	0	0	0	0	0	0
Mourning Dove	0	1	1	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	1	2	1	0	0	1	2	0	1	2	0
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	1	0	0	0	0	0	0	1
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	1	0	0	0	0	0	0	0	0	0
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	0	0	0	1	0	1	1	0	1	0	1
Eastern Phoebe	0	0	0	0	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	1	0	0	0
Red-eyed Vireo	4	2	0	0	2	0	4	2	2	0	0
Blue Jay	2	1	1	1	0	0	0	0	1	0	0
American Crow	1	0	0	0	0	0	0	0	0	1	0
Black-capped Chickadee	0	2	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	0	0	0	0	0	0	2	0	1	2	0
White-breasted Nuthatch	0	0	0	0	0	0	0	0	0	0	0
Carolina Wren	0	0	0	0	0	0	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	0	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	2	0	0	0	1	0	3	0	0	0	1
Swainson's Thrush	0	0	0	0	0	0	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	2	2	1	1	0	2	1	1	0	3	2
American Robin	0	0	0	0	0	0	0	0	0	0	0
Gray Catbird	3	2	1	0	0	0	0	0	0	2	0
Northern Mockingbird	0	0	1	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 90	Station 91	Station 92	Station 93	Station 94	Station 95	Station 96	Station 97	Station 99	Station 100	Station 101
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	0	4	0	0	0	0	0	0	0	10	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	1	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	2	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	1	0	0	0	0	0	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	1	1	0	0	0	0	0	0	0	2	0
American Redstart	1	1	0	0	0	0	0	0	0	1	0
Worm-eating Warbler	0	0	0	0	0	0	0	1	1	0	0
Ovenbird	1	2	0	0	0	2	3	2	1	2	0
Louisiana Waterthrush	0	0	0	0	0	0	0	0	0	0	0
Kentucky Warbler	0	0	0	1	0	0	0	0	0	0	0
Common Yellowthroat	0	1	0	0	0	0	0	0	0	0	0
Hooded Warbler	1	0	0	1	0	0	1	0	0	0	0
Scarlet Tanager	0	0	0	0	0	0	0	0	1	1	1
Eastern Towhee	1	0	0	1	0	0	1	0	0	0	1
Chipping Sparrow	0	0	0	0	0	0	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	1	0	0	0	0	0	0	0	0
Northern Cardinal	0	1	2	0	0	0	0	0	0	0	0
Rose-breasted Grosbeak	0	2	0	0	0	0	0	0	0	0	0
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	0	1	0	0	0	0
Baltimore Oriole	0	2	0	0	0	0	0	0	0	0	0
House Finch	0	0	0	0	0	0	0	0	0	0	0
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 90	Station 91	Station 92	Station 93	Station 94	Station 95	Station 96	Station 97	Station 99	Station 100	Station 101
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 102 D. Forest	Station 103 C. Forest	Station 104 D. Forest	Station 105 D. Stream	Station 106 D. Forest	Station 107 F. Wetland	Station 108 D. Forest	Station 109 D. Forest	Station 110 D. Stream	Station 111 D. Forest	Station 112 D. Forest
Red-tailed Hawk	0	0	0	0	0	0	0	0	0	0	0
Wild Turkey	0	0	0	0	0	0	0	0	0	0	0
Mourning Dove	0	0	0	0	0	0	0	0	0	0	0
Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0	0	0
Red-bellied Woodpecker	1	1	3	0	2	1	1	1	1	0	2
Yellow-bellied Sapsucker	0	0	0	0	0	0	0	0	0	0	0
Downy Woodpecker	0	0	0	0	0	0	0	0	0	0	1
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Yellow-shafted Northern Flicker	0	0	0	0	0	0	0	0	1	0	2
Pileated Woodpecker	0	0	0	0	0	0	0	0	0	0	0
Eastern Wood-Pewee	1	0	2	1	1	0	1	0	0	1	0
Eastern Phoebe	0	0	0	1	0	0	0	0	0	0	0
Great Crested Flycatcher	0	0	0	0	1	0	0	1	0	0	0
Yellow-throated Vireo	0	0	0	0	0	0	0	2	0	0	0
Red-eyed Vireo	1	0	0	1	0	1	1	0	0	1	1
Blue Jay	3	0	0	1	0	0	1	0	2	1	0
American Crow	2	2	1	0	0	3	0	0	0	1	1
Black-capped Chickadee	0	0	0	0	0	0	0	0	0	0	0
Eastern Tufted Titmouse	3	2	3	1	0	3	1	0	2	1	0
White-breasted Nuthatch	0	0	0	0	0	0	1	0	0	0	0
Carolina Wren	0	0	0	0	0	1	0	0	0	0	0
House Wren	0	0	0	0	0	0	0	0	0	0	0
Blue-gray Gnatcatcher	1	0	0	0	0	0	0	0	0	0	0
Eastern Bluebird	0	0	0	0	0	0	0	0	0	0	0
Veery	2	0	0	0	1	0	0	1	0	1	0
Swainson's Thrush	0	0	0	0	0	1	0	0	0	0	0
Hermit Thrush	0	0	0	0	0	0	0	0	0	0	0
Wood Thrush	3	1	4	2	2	1	2	3	1	1	0
American Robin	2	0	0	2	0	0	1	0	0	0	0
Gray Catbird	3	0	0	0	0	1	0	3	0	1	0
Northern Mockingbird	0	0	0	0	0	0	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

Species	Station 102	Station 103	Station 104	Station 105	Station 106	Station 107	Station 108	Station 109	Station 110	Station 111	Station 112
European Starling	0	0	0	0	0	0	0	0	0	0	0
Cedar Waxwing	1	0	0	0	0	0	0	0	15	0	0
Yellow Warbler	0	0	0	0	0	0	0	0	0	0	0
Chestnut-sided Warbler	0	0	0	0	0	0	0	0	0	0	0
Magnolia Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Blue Warbler	0	0	0	0	0	0	0	0	0	0	0
Yellow-rumped Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-throated Green Warbler	0	0	0	0	0	0	0	0	0	0	0
Blackpoll Warbler	0	0	1	0	0	0	0	0	0	0	0
Cerulean Warbler	0	0	0	0	0	0	0	0	0	0	0
Black-and-White Warbler	0	0	0	0	1	0	0	2	0	0	0
American Redstart	0	0	0	0	1	0	0	0	0	0	0
Worm-eating Warbler	0	0	0	0	1	0	0	1	0	0	0
Ovenbird	1	1	2	1	4	0	0	3	0	1	0
Louisiana Waterthrush	0	0	0	1	0	3	0	0	2	0	0
Kentucky Warbler	0	0	0	0	0	0	0	0	0	0	0
Common Yellowthroat	0	0	0	0	0	0	0	0	0	0	0
Hooded Warbler	0	0	0	0	0	0	0	0	0	0	0
Scarlet Tanager	0	0	2	0	3	0	0	2	0	0	1
Eastern Towhee	3	1	1	0	0	0	0	0	0	0	0
Chipping Sparrow	1	0	0	0	0	1	0	0	0	0	0
Field Sparrow	0	0	0	0	0	0	0	0	0	0	0
Song Sparrow	0	0	0	0	0	0	0	0	0	0	0
Northern Cardinal	0	1	0	0	2	0	1	0	0	0	0
Rose-breasted Grosbeak	0	0	0	0	1	0	0	0	0	0	0
Indigo Bunting	1	0	0	0	0	0	0	0	0	0	0
Red-winged Blackbird	0	0	0	0	0	0	0	0	0	0	0
Common Grackle	0	0	0	0	0	0	0	0	0	0	0
Brown-headed Cowbird	0	0	0	0	0	1	0	1	0	0	3
Baltimore Oriole	0	0	0	0	0	0	0	0	0	0	0
House Finch	0	0	0	0	0	1	0	0	0	0	0

Appendix 8-A. Total number of birds detected at each point count station in Morristown NHP in 2002 and 2003 (continued).

	Station 102	Station 103	Station 104	Station 105	Station 106	Station 107	Station 108	Station 109	Station 110	Station 111	Station 112
American Goldfinch	0	0	0	0	0	0	0	0	0	0	0
House Sparrow	0	0	0	0	0	0	0	0	0	0	0

As the nation's primary conservation agency, the Department of the Interior has responsibility for most of our nationally owned public land and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

National Park Service
U.S. Department of the Interior



Northeast Region
Inventory & Monitoring Program
Northeast Temperate Network
54 Elm Street
Woodstock, Vermont 05091

<http://www1.nature.nps.gov/im/units/netn/index.cfm>

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